

# AMERICAN ARTISAN

APRIL  
1942



RESIDENTIAL AIR CONDITIONING  
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED  
1888

# LAMNECK PRODUCTS, Inc.



HEATING EQUIPMENT  
SIMPLIFIED FURNACE PIPE AND FITTINGS, AIR  
CONDITIONING DUCT AND FITTINGS, GRAVITY  
AND AIR CONDITIONING REGISTERS AND GRILLES.

MIDDLETOWN, OHIO

FARM EQUIPMENT  
"BUCKEYE" METAL CORN CRIBS AND GRAIN BINS.  
"SILVER SHIELD" METAL SILOS, ROOFS AND SILO  
ACCESSORIES, TANKS, TROUGHS AND FOUNTAINS.

April, 1942

To Our Lamneck Jobbers  
And To Their Customers

Gentlemen:

Each of us must seek and find his proper place in Our Country's gigantic War and Victory Program. As we take our place in the ranks, we must remember that the duty of many will be to continue their regular operations as their contribution to this huge program.

As long as our normal products continue to serve this end, we shall supply you to the best of our ability. Today these products are still a definite part of the Federal Housing Program. If and when they cease to be, we shall then assume our new duties with cheerful dispatch.

Interruptions and changes in the usual manner of doing business will be many. It is the order of the day. We cheerfully pledge ourselves, and know that you join with us, to perform our daily task in the best interest of Our Country's needs.

Sincerely,

Perl S. Miller, President  
LAMNECK PRODUCTS, INC.

PSM/f

## LAMNECK PRODUCTS INC. Middletown, Ohio

Simplified Furnace Pipe and Fittings and Prefabricated Duct and Fittings for all Types

of Residential, Commercial and Factory Warm Air Heating and Air Conditioning Systems

*Appropriate for*  
**Low Cost Homes**  
*and*  
**Defense Housing**



**HEAT-RITE**

**Ideal for  
Re-modeling  
and Replacement**



Auer Heat-Rite warm air Registers and Intakes come within the requirements, as to cost and efficiency, for most small-home and group housing requirements. The fin-type face, integral with border, gives downward directional flow.

These registers are likewise very practical for repair and remodeling work, and for conversion from gravity to forced air—since dimensions are identical

with previous standard baseboard registers of older types, and existing fittings can be used.

Auer makes several other designs in sturdy, inexpensive registers and intakes for small home uses—a market in which Auer has long specialized. Complete Auer Register Book, showing all warm-air and air conditioning models, sent on request. Special Grille Catalog "G" also available on flat metal grilles.

**THE AUER REGISTER CO., 3608 PAYNE AVE., CLEVELAND, OHIO**

**AUER REGISTERS**  
**& GRILLES · For Air Conditioning *and* Gravity**

# AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

WITH WHICH ARE MERGED

FURNACES  
and  
SHEET METALS

AND

Warm-Air  
Heating

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 111, No. 4

April, 1942

Founded 1880

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## In This Issue

IF EVER there was a time when the business man MUST read—that time is right now.

Even the most casual glance at the front section of this issue should make the above statement apparent.

Instead of easing up, the need for reading is getting more important every month. Nothing in the picture is stable—the whole situation is boiling so fast that even a month's negligence of your reading can put you so far behind you never will catch up.

And you can't stop at a mere reading. Nowadays you have to STUDY what you read.

All these orders, regulations, control specifications are condensed and compacted. You can't read "between the lines"—you have to dig out word for word the EXACT meaning and procedure you are to follow.

This attempt to make casual reading serve for careful study has been shown time and time again at this year's conventions where contractors tried to ask intelligent questions regarding orders when they didn't fully understand what they were talking about.

Not only must you STUDY what you read—you also have to ask questions, write letters, pay visits to local control offices. Only as you do all these extra things can you clarify your own thinking.

Truly, this is a time of change—and every change requires additional energy and time. There's no way to duck the job. Neither is there any way to avoid the restrictions you now operate under.

You will save yourself much nervous energy and time if you will make up your mind—you have to read and study.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

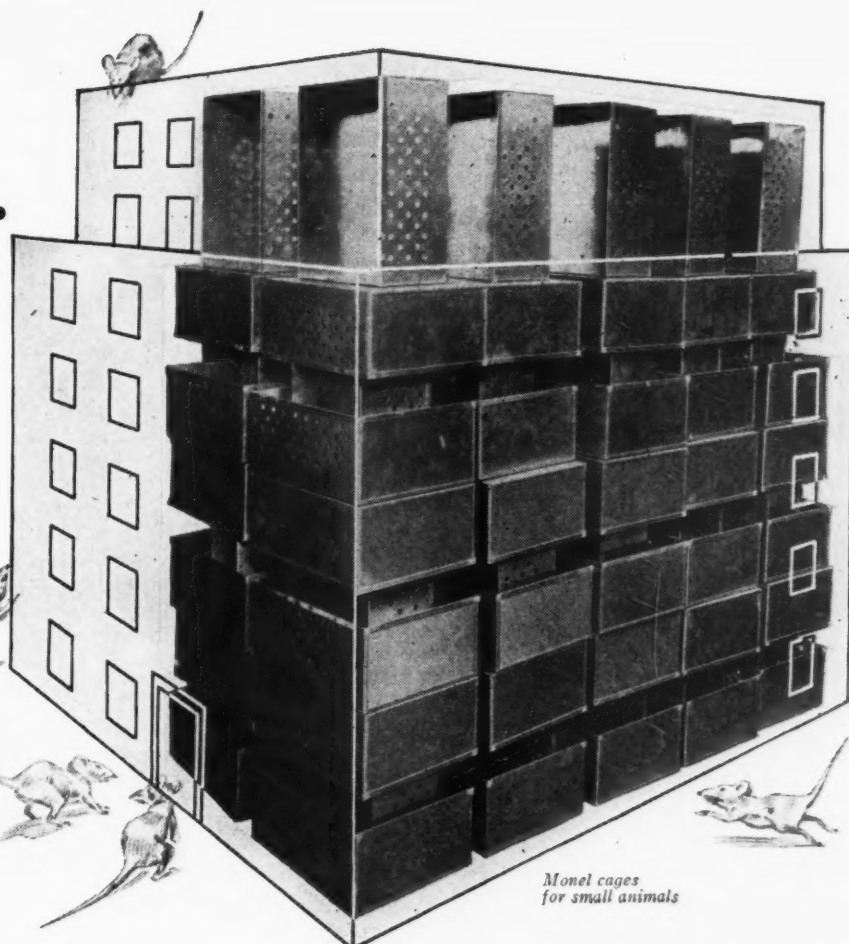
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**More than 8,000 copies of this issue are being distributed**

# HOUSES FOR MOUSES...

by Tim Shears



Monel cages  
for small animals

★ *Maybe I'm nuts or maybe it's Joe Spiegle. Pokin' around his shop one day, checkin' up on war orders, I run across a pile of perforated pans. "Hi, Joe!" I call, "Don't tell me you're buildin' a house of blocks!" "No," comes back Joe, "it's a block of houses...houses for mouses!"*

These Monel boxes, Joe explains, are cages for guinea pigs, rats, mice an' such. Some big college doin' experiments for the Army has 'em made up. They're easy to put together an' all soft soldered . . . a cinch of a job for Joe. The reason they use Monel, he tells me, it's easy to keep clean. "Another thing," says Joe, "these boxes have to be Monel so they won't rust. Believe it or not," he adds, "rust might spoil the little beggars' diet!"

*There's plenty more jobs floatin' around that are needed to win the war. Take the picture of the guy weldin'. Before the war, spot welded perforated Monel cylinders like these were used in all kind of plants for takin' water an' solid impurities out of steam, compressed air, and industrial gases. Now they're used for*

cargo boats . . . inside of the boiler drum three cylinders to a separator . . . to make sure steam to engines an' turbines is clean an' dry. You can't yank out separators to fix 'em, so Monel is used because it won't rust an' corrode. An' there's no trouble perforatin', punchin', and spot an' electric weldin'.

*A good bet frequently for sheet metal work is textile plants. Call on a few an' you'll be surprised the amount of war work they're handlin'. The quarter round wood dye tank lined with Monel, for instance. It's used in a big plant that turns out felt for the Army and Navy . . . for splints, gaskets, field saddles, artillery gun cart harness, arch supports an' etc. The "rake beams" as they call 'em are Monel, too. That's because Monel doesn't rust, it stands off corrosion by dye liquors, keeps a smooth surface, an' doesn't need long "boil-outs".*

Sometimes it's kind of tough to figure out how a job like a mouse cage can help win the war. But if Uncle Sam wants it your job

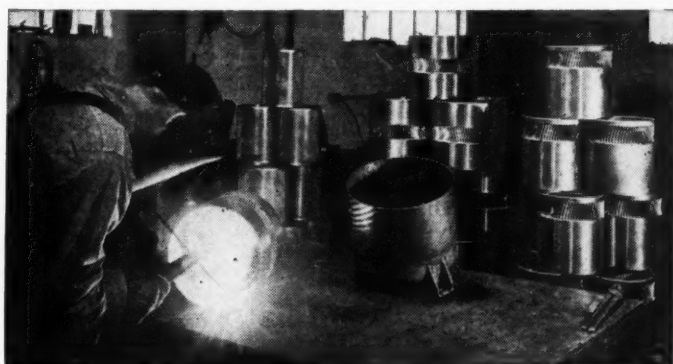
an' mine is to make it. Let me know anyway I can help.

Yours  
for Victory,

*Tim Shears*

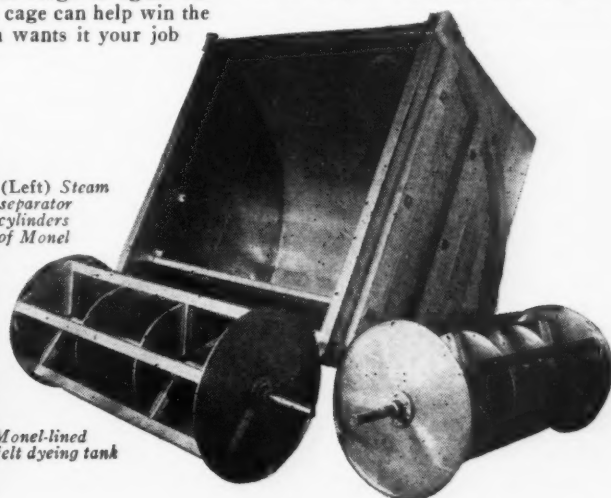
THE INTERNATIONAL NICKEL COMPANY, INC.  
67 Wall Street  
New York, N. Y.

★  
**FIRST THINGS FIRST** . . . With the Nation at war, supplies of Monel, Nickel and Nickel Alloys are needed for our armed forces. All efforts must now be aimed toward victory. In the meantime, The International Nickel Company will continue to issue information which it is believed will be of interest to metal users who are concerned with the war needs of today and the peace-time progress of the future.



(Left) Steam  
separator  
cylinders  
of Monel

Monel-lined  
felt dyeing tank





## *Roofing for America's War Plants...*

### **BETH-CU-LOY GALVANIZED STEEL SHEETS**

Expansion of America's industries for war involves more than the construction of great new plants alone. Existing facilities also require extensive repairs and extensions. Here, even the sheet-metal contractor of moderate size can serve, for many concerns have called upon outside help for work which in normal times would have been handled by plant maintenance crews.

When you bid on such industrial work, whether roofing, siding or ductwork, you'll find it wise to recom-

mend the use of corrosion-resisting Beth-Cu-Loy Galvanized Steel Sheets. Doubly fortified against the corrosive atmosphere of industrial areas by a tight coating of zinc, plus the addition of 0.20 to 0.30 per cent copper to the steel itself, Beth-Cu-Loy is good for extra service. That means long-run economy and conservation of valuable steel for future needs. Beth-Cu-Loy lasts far longer, yet it costs only a few cents more per sheet than ordinary galvanized steel.

## **BETHLEHEM STEEL COMPANY**





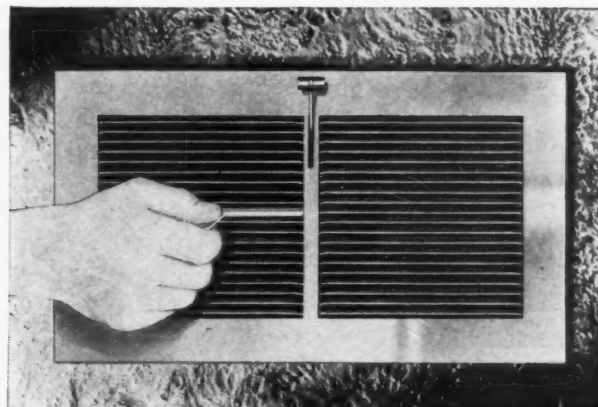
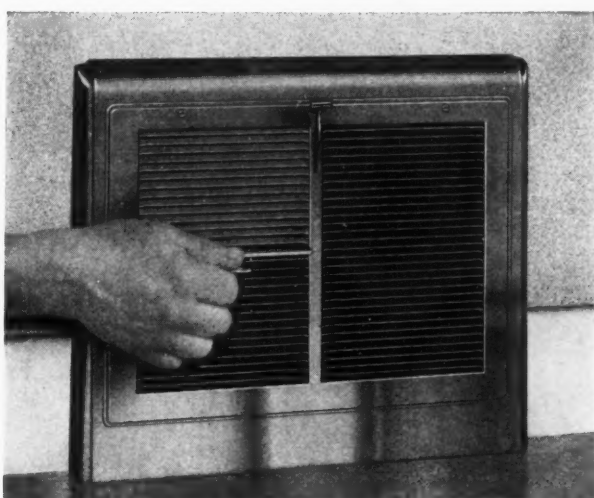
# SUPERIORITY *for War-time Housing* WON'T COST YOU AN EXTRA PENNY!

*and that's  
a worthwhile  
advantage*

Extra quality at no increase in cost never fails to make a decidedly favorable impression. Hence in bidding for war-time housing jobs, why not avail yourself of the superiority for which H&C have always been famous—superiority of design, superiority of construction, workmanship and finish? Certainly you have nothing to lose and considerable to gain by doing so.

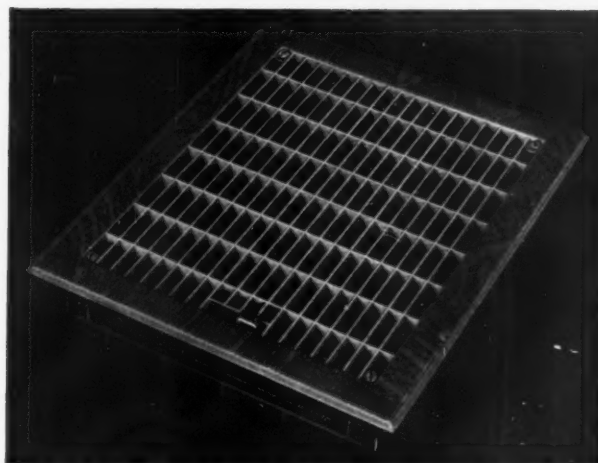
The H&C line meets perfectly every war-time housing requirement, whether for low-cost Air Conditioning or Gravity installations. Standardize on H&C and you'll always be able to offer better registers and grilles at no premium for quality. And that's a worthwhile advantage in getting your share of the available business.

Current Catalog: No. 42 combining Gravity, Air Conditioning and Furnace Accessory Lines. If not on hand, write us.



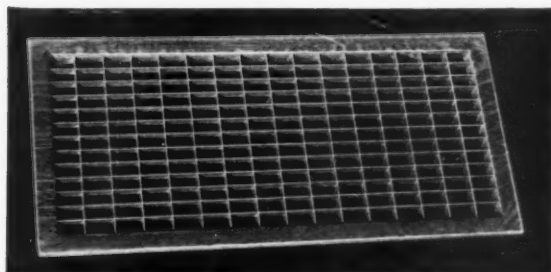
**H&C No. 741 SIDEWALL REGISTER**

A low-cost, but exceptionally fine air conditioning register with positive single shutter valve.



**No. 210 "NO-FLEX" FLOOR REGISTER**

A simple comparison will convince you that this is the best-made, most attractive floor register on the market.



**No. 265 "NO-FLEX" RETURN AIR FACE**


Matches in appearance the No. 210 Floor Register. Superiority is evident in every detail of its construction.

**No. 130 BASEBOARD REGISTER**

Tops for Gravity. Also ideal for converting existing Gravity systems to Air Conditioning.

## HART & COOLEY MANUFACTURING CO.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulleys

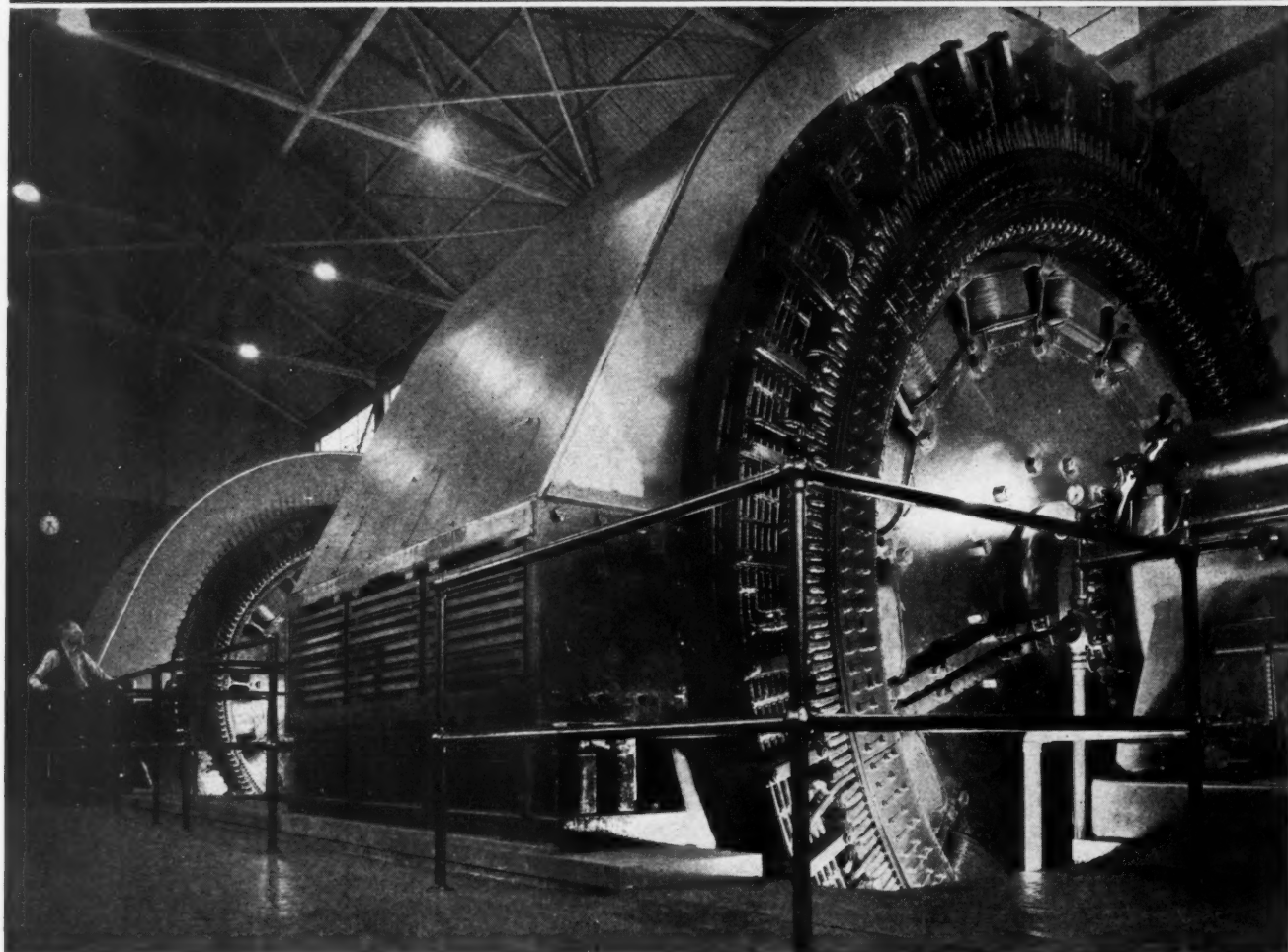
HOLLAND  MICHIGAN

Chicago Office: 61 W. Kinzie St.

Philadelphia Office: 1600 Arch St.

Western Representatives: Godfrey Rueger Co., Los Angeles, San Francisco, Portland, Seattle, Salt Lake City, Denver

## Where trustworthy tools are vital



When you read in your daily paper about power shortages and power rationing, you realize the importance of electrical power to a nation at war. Fortunately, our ample peace time supply is standing us in good stead now that power has become an almost "critical" war material. To the men of the electrical industry, the name "Crescent" has long been a household word . . . a mark that identifies the best in hand tools.

Crescent Tools include adjustable wrenches, pliers of all types, hacksaws, snips, screwdrivers, etc., etc. They are sold under the "Crescent" and "Cresto-loy" trade names by hardware and industrial distributors everywhere.

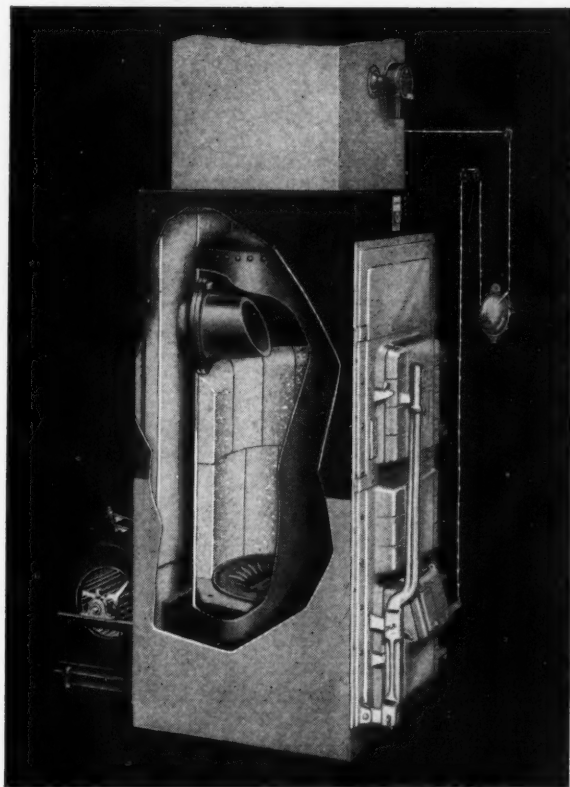
CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

**CRESCENT TOOLS**  
*Give Wings to Work*



For Defense Housing Choose  
**SUNBEAM**  
 WARM-AIR FURNACES AND  
 WINTER AIR CONDITIONERS

● Compactness of SUNBEAM units literally adds extra basement room to K. V. Wolsey Co.'s small defense homes at Hazelwood Park, Hyde Park, Mass. 250 additional homes now being built will use SUNBEAM units too!



**Here's why the ALLERTON meets  
 low cost housing requirements**

**Suitability** Right in size, right in price, the Allerton is a coal-fired Winter Air Conditioner engineered to specifications of various Governmental agencies—designed to *give* what defense housing needs.

**Easily Installed** In homes without basements, put the Allerton in a utility room, kitchen, or other suitable space. Takes little room—just 26" wide, 59" high, 43 1/4" deep with blower.

**Attractive** Jackets are neatly finished and have the distinctive Ivory and Gold SUNBEAM name plate.

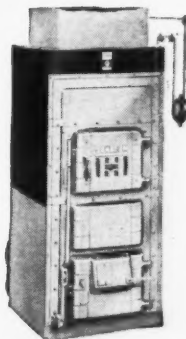
**Quality** The heating element is heavy steel, welded and riveted. The blower is the quiet double inlet type with self-aligning bearings. Motor has reserve capacity, is protected against overload. Other features too, are backed by SUNBEAM dependability.

**Capacity** Fits the requirements of most small homes. Btu capacity at register: with soft coal, 64,700; hard coal or coke, 51,800. CFM range from 600 to 800.

*Time Payments available in accordance with U. S. Government regulations.*



**AMERICAN & Standard  
 RADIATOR & Sanitary**  
*New York CORPORATION Pittsburgh*



**AMERICAN**  
 HEATING EQUIPMENT  
 COSTS NO MORE THAN OTHERS

The products illustrated herein are normally available for prompt delivery. Our ability to furnish these, as well as the products shown in our catalogues, is subject to the needs of the National Defense Program.

★ ★ DEFEND OUR COUNTRY. ENLIST NOW IN THE U. S. REGULAR ARMY ★ ★

★

# MORRISON

*Airstream* BLOWER WHEELS

FOR DEFENSE HOUSING

## SAVE *Vital* STEEL

★

CONSERVATION of steel is important in furnaces built for defense housing. AIR-STREAM Blower Wheels use less steel for specified air delivery.

### *Save Labor Too!*

Our patented construction produced on automatic equipment saves man hours. This saving in labor cost is passed on to you.



BUILD YOUR OWN BLOWERS! Consult our engineers. They will furnish you proper scroll design to meet your re-

quirements. Write for complete information or request to have engineer call.

**MORRISON PRODUCTS, INC.**  
EAST 168TH & WATERLOO ROAD  
CLEVELAND, OHIO

MORRISON IS CONTRIBUTING TO VICTORY BY CONSERVING STEEL!

# Figurin' the Angles

What smart men do in these times to make money with Fiberglas\* Dust-Stop\* Air Filters



## And Here's the Sales Plan That'll Help You Have Them!

**I**T'S HARD TO TELL what metal shortages will do to your business. But it's easy to tell that one good way of keeping your business chin up is to develop lines like furnace-cleaning, repairing, and filter replacements.

### A Honey of a Sales Plan—Free!!

The Dust-Stop Sales Plan will really help you do this. It's *free*! And it offers you the biggest set of dealer helps in the filter field! All *free*!

There are mailing pieces . . . newspaper mats . . . postcards . . . radio scripts . . . reminder labels. Every one of them packs a powerful sales wallop. Every one of them has your name and address imprinted *free*!

And that's not all—

### Advertising Backing—And How!

In addition to all these dealer helps, you have the backing of an all-out advertising campaign—reaching the millions who read American Home, Better Homes and Gardens, Life, Saturday Evening Post—telling these millions where and when to buy Dust-Stops.

How do filter replacement profits figure?

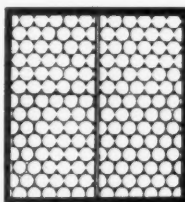
### Nice Profits—New Business

You can make as much as \$2.00 to \$3.00 on every single furnace every year. You can work on at least 200 or 300 furnaces a year. Multiply those figures and what you get "ain't hay."

Besides this out-and-out profit, filter replacement work gets your foot in the door for a lot of business-boosting cleaning and repair work.

So, get hold of this Dust-Stop Sales Plan and get going. Write your furnace manufacturer or jobber today. Tell him you want your plan right away.

*Owens-Corning Fiberglas Corporation, Toledo, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*



**FIBERGLAS\* DUSTOP\* AIR FILTERS**  
T.M. Reg. U.S. Pat. Off.



The pressure is on! Vital construction projects must go up quickly to push our war effort. Yet this is not all—the work must be durable so it will need little “looking-after” in the years to come.

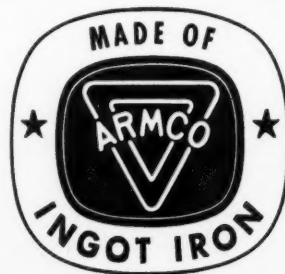
You can meet these important government requirements and do a job you’ll be proud of by using galvanized ARMCO Ingot Iron. As many contractors know from long ex-

perience, it is an easy-working, long-lasting sheet metal.

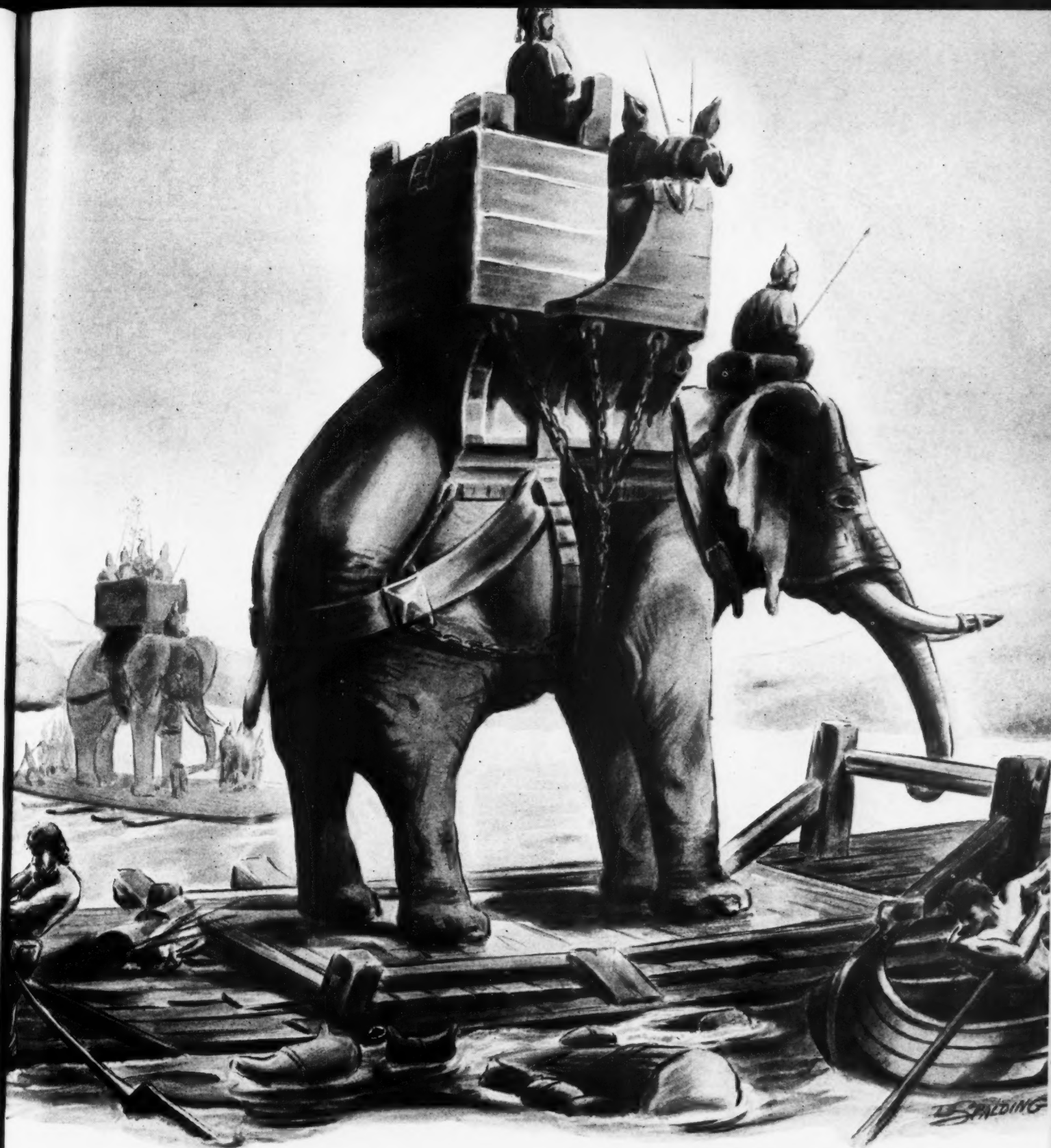
Moreover, the uniform flatness and full, tight galvanizing of ARMCO Ingot Iron enable you to do quick, accurate work in the shop. Accurate shop work in turn means swift assembly and erection. All of which saves precious *time* for you and the United Nations.

Construction engineers will wel-

come these facts. They will realize that when you use galvanized ARMCO Ingot Iron on their high “A” priority jobs you are giving them clean, durable work; and that you are saving them valuable time in the bargain. We shall be glad to assist with suggestions and all the technical data you need. Just write to The American Rolling Mill Co., 830 Curtis St., Middletown, Ohio.



These buildings, part of one of the Army's great new ordnance plants, were completed well ahead of schedule. More than 258 tons of galvanized ARMCO Ingot Iron was used for the roofing and siding.



Over the Pyrenees and Alps and across the broad, swift-flowing Rhone River, Hannibal led his well-equipped army to overcome the Romans.

## *Famous Battles*

—In the past as in the present, advance preparation, work behind the lines, production that must come before the battle, weighed heavily in the decision. Today, more than ever, the responsibility, not only on manufacturers but on their distributors and dealers, is tremendous. Each performs his vital function. American Blower Distributors and Dealers are doing all in their power to speed deliveries, place fans, blowers, ventilators and heaters where they are needed most, provide prompt, dependable service to keep the nation's war industries producing. You can count on the cooperation of American Blower Dealers and Distributors during this emergency.

# AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT, MICHIGAN  
In Canada: CANADIAN SIROCCO COMPANY, LTD., Windsor, Ont.

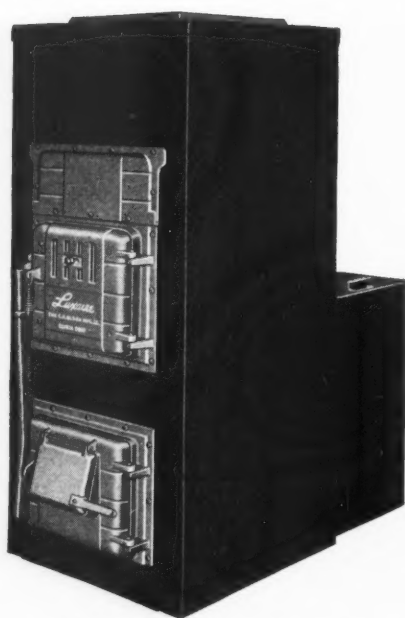
Division of American Radiator and "Standard" Sanitary Corporation



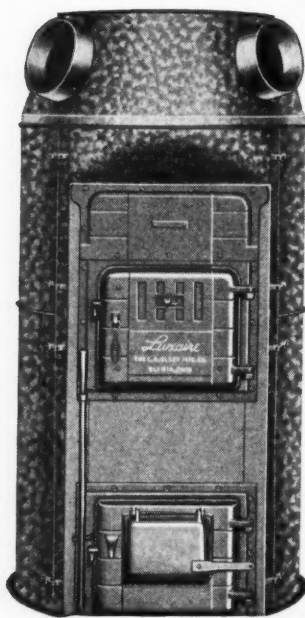
# *Luxaire* **LOW COST!**

## *Defense Housing*

# **FURNACES**



Series No. 718-SA and No. 720-SA  
Coal Burning Forced Air



Series No. 720-SAG  
Coal Burning Hand Fired



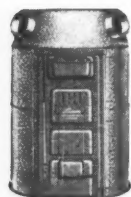
Series No. 718-SH  
Coal Burning Forced Air



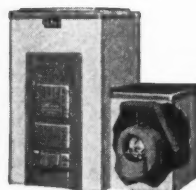
Government approved housing projects are going to be a major factor in keeping your business going this year. And there is plenty of that profitable business to be had for the man that goes and gets it.

Luxaire has got just what you need to get these orders.

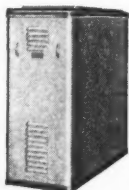
Luxaire gives defense homes real defense against heating problems for many years.



**SERIES 600**  
Coal Burning Hand  
Fired Gravity Fur-  
nace. A leader in  
its field.



**SERIES AC 700**  
Coal Burning Hand  
Fired Air Conditioning  
Unit, available in  
Stoker models.



**SERIES A**  
Gas Fired Air Condi-  
tioning Unit. Quality  
—Comfort—Economy.



**SERIES H**  
Gas Fired Utility  
Air Conditioning  
Unit—where space  
is important.



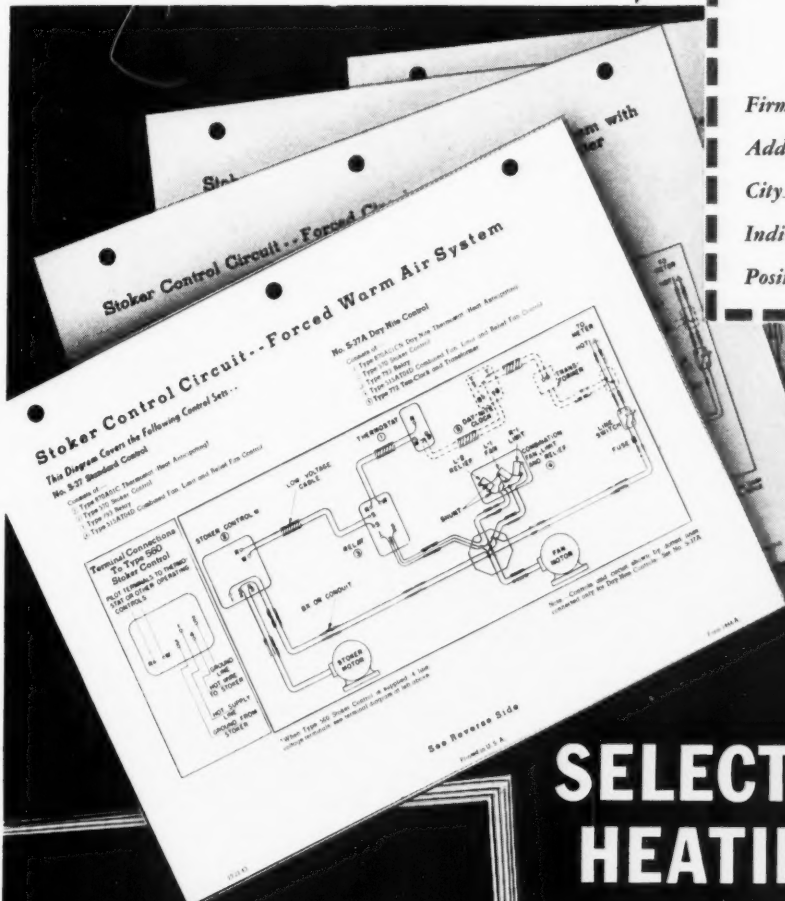
**SERIES G**  
Gas Fired Gravity  
Unit—Economy for  
the small home



**SERIES 8000**  
Oil Burning Air Con-  
ditioning Unit. Com-  
pact, efficient.

**THE C. A. OLSEN MANUFACTURING COMPANY, ELYRIA, O.**

**MAIL COUPON  
NOW FOR FREE  
DIAGRAMS**



**Penn Electric Switch Co., Goshen, Indiana.**

Gentlemen: Without obligation, please send \_\_\_\_\_ sets of control wiring diagrams for the following heating systems:

- ☐ Continuous Ignition Oil Burner
- ☐ Intermittent Ignition Oil Burner
- ☐ Stoker ☐ Gas ☐ Unit Heater
- ☐ Hand-Fired ... Damper Motor

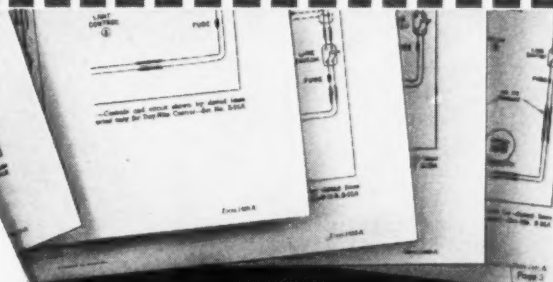
Firm Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Individual's Name \_\_\_\_\_

Position \_\_\_\_\_



# HOW TO SELECT AND INSTALL HEATING CONTROLS

**H**ERE are clear, accurate, detailed and dependable directions covering controls for all types of heating systems . . . material of great practical value right now to service and installation men.

Seven basic sets of diagrams cover every kind of installation . . . every kind of fuel. Each individual diagram shows the external hook-up . . . lists and illustrates each separate control necessary to the system . . . explains the function and operating sequence of each control.

Now, when efficient heating and fuel economy are so vital, Penn offers this complete and helpful information to service and installation men absolutely free. These diagrams are helpful in selection of proper controls and following the diagrams insures a correct and efficient installation.

**Check and mail coupon, or write now for diagrams you can use. They'll be sent promptly—in a neat loose-leaf binder. Penn Electric Switch Co., Goshen, Indiana.**



**AUTOMATIC  
CONTROLS  
INSTALLATION  
WIRING AND  
SERVICE**


**PENN ELECTRIC SWITCH CO.  
GOSHEN, INDIANA.**



# PENN CONTROLS

REFRIGERATION, AIR CONDITIONING, ENGINE,

HEATING, PUMPING AND AIR COMPRESSOR



# *Of Course, You're Helping*

**...TO KEEP 'EM FLYING**

**...TO WIN THE WAR**

Some people speak of the current world conflict as total war. Others refer to it as a war of planes, tanks, guns and ships. Both are right, of course, but some time ago we heard it described by a name which we think is possibly even more appropriate. It was called the world struggle for metals.

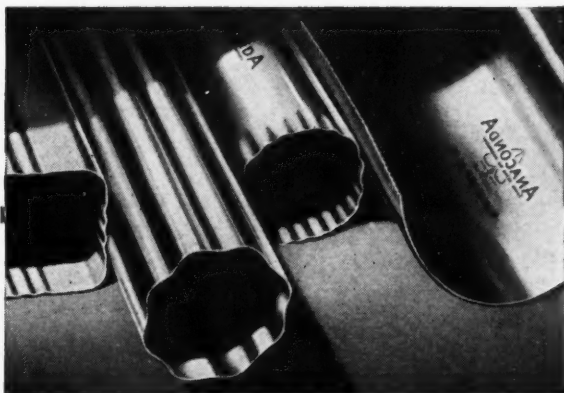
Surely, never before in our history have we Americans appreciated the true worth of steel, of copper, tin, aluminum and all the other natural resources as we do today. This is particularly true of those of us in the great metal working industries. But, even as we feel the pinch of these restrictions, we can not fail to understand that each and every one of us must do his share to protect the vast resources which have made our nation great if we wish to retain them.

For many months, you and we have been learning to get along without materials we really need. That will continue to be a part of our jobs in helping to win the war. Others are helping by working long hours on the production lines . . . still others by serving with the armed forces. Only by such coordinated effort . . . sacrifice . . . production . . . fight . . . will our nation go on to sure and complete victory.

*Courtesy Vultee Aircraft, Inc.*

**A DEPENDABLE SOURCE OF  
SUPPLY FOR 83 YEARS**

THE J. M. & L. A.  
**OSBORNE Co**  
CLEVELAND, OHIO  
BUFFALO • CINCINNATI • DETROIT  
Manufacturers—Distributors of Metals and Metal Products



The sheet copper that  
might have been used  
for this metal work...

**INSTEAD...** Made Everdur Copper-Silicon  
Alloy for the Pilot House of  
this new Coast Guard Cutter



Everdur\* got the call for this tough war task because it is strong, rust-proof and highly resistant to salt water corrosion. Because it is readily welded for the soundest type of construction. Because it is non-

magnetic—won't affect the performance of vital pilot house instruments. These are some of the reasons why Everdur is in such great demand today—and why no copper is available for our buildings and homes. 4235

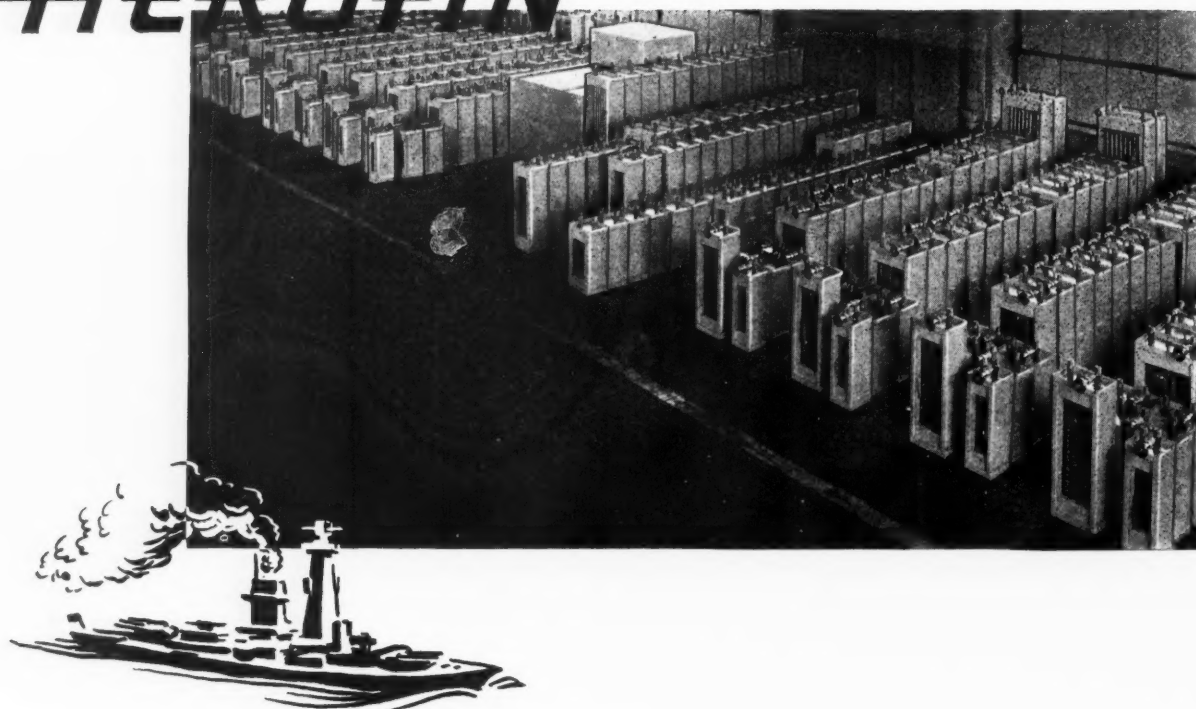
\*Trade-mark of The American Brass Company, Reg. U. S. Pat. Off.



**Anaconda Copper**

THE AMERICAN BRASS COMPANY • General Offices: Waterbury, Connecticut  
Subsidiary of Anaconda Copper Mining Company • In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario

# AEROFIN



## THEY DON'T NEED A FIREPLACE ON A CRUISER

★ These Aerofin heating coils are destined for U. S. Navy destroyers and cruisers—an assurance that officers and men will be warm under all conditions. Long life, durability under severe usage, exceptional efficiency, and instantaneous heat transfer are a few of the reasons why the Navy accepts Aerofin.

★ Although your heating requirements may not call for coils that meet Navy specifications, you can be sure of the same guarantee in ALL Aerofin coils. Before shipment, EVERY Aerofin heating coil is tested to 400 pounds of air under water, 1000 pounds hydrostatic—and guaranteed for 200 pounds of steam working pressure and 388° F. working temperature. For certainty in operation—specify AEROFIN.

**AEROFIN CORPORATION**

410 S. GEDDES ST., SYRACUSE, N. Y.

CHICAGO • DETROIT • NEW YORK • PHILADELPHIA • DALLAS • CLEVELAND • TORONTO

# PUNCH...

*in the pinch!*

## THE NEW WISE FURNACE FOR DEFENSE HOME HEATING

Here's the new WISE furnace for defense home heating. It will provide you with the needed wallop to keep your sales up to a profitable level in the present tight selling situation. Available as a cast-iron unit for either coal or oil firing you can go after this lucrative market with the full assurance of dependable, durable, efficient heating for years to come on every installation.

Capacities: Coal fired, 44,880 Btu gravity, 66,000 Btu forced air; Oil Fired 49,000 Btu gravity and 75,000 Btu forced air. This unit can quickly and cheaply be converted from oil to coal firing if the occasion warrants, at very little cost to the homeowner.



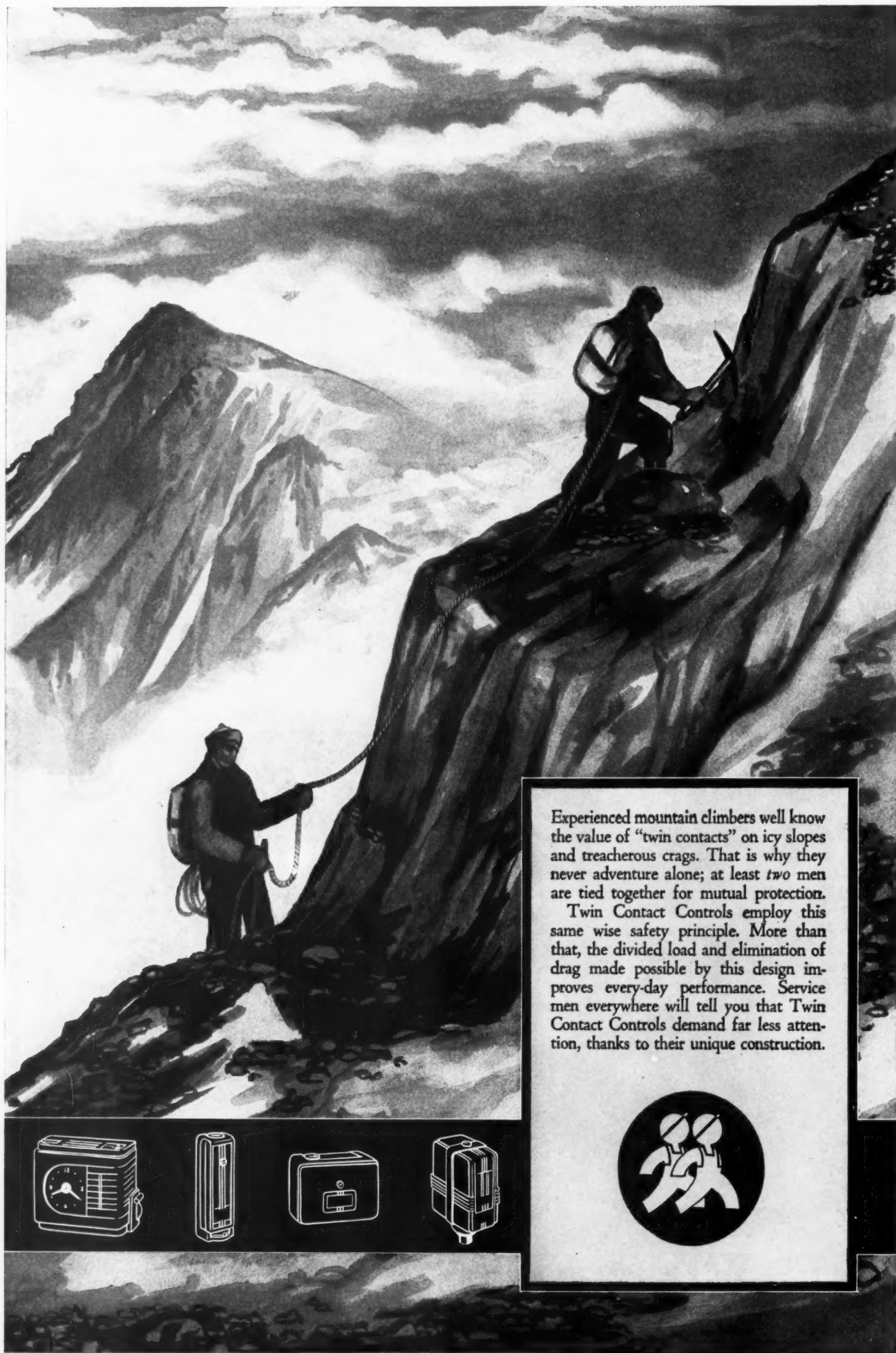
*... and don't forget the  
famous Wise series "A"*

For gravity work the Series "A" offers several advanced features to assure top performance. Items such as the one-piece cellular firepot, the new ashpit and lower front and one-piece, self-cleaning radiator give your customer clean and efficient heating consistent with the utmost economy.

For Winter air conditioning jobs the Series "A" is furnished with a one-piece square base and enameled square casing. These two models will enable you to cope with the competition, and intelligent and aggressive salesmanship will clinch the jobs for you.

WRITE FOR LITERATURE!

**THE WISE FURNACE COMPANY**  
**AKRON** **OHIO**



Experienced mountain climbers well know the value of "twin contacts" on icy slopes and treacherous crags. That is why they never adventure alone; at least *two* men are tied together for mutual protection.

Twin Contact Controls employ this same wise safety principle. More than that, the divided load and elimination of drag made possible by this design improves every-day performance. Service men everywhere will tell you that Twin Contact Controls demand far less attention, thanks to their unique construction.





## A Domestic Stoker Timer *with* Industrial Stamina

Although this Twin Contact Timer is built for use with domestic stokers, the relay capacity is rated at 1 H.P. with ample reserve. This extra margin is typical of the entire instrument; the synchronous movement is of the industrial type instead of the usual clock motor, assuring ample power and long life. Yet because the synchronous motor is the wearing part of any timer, this one is easily replaceable so you don't have to buy and install a whole new timer just for the motor. The rubber mount assures constantly silent operation.

There is a complete line of Twin Contact Controls, including plain and clock thermostats as well as operating and limit controls for warm air, hot water, vapor or steam systems. All are sold under the name of the manufacturer of the stoker with which they are designed to operate. If you sell a good stoker, your manufacturer can tell you all about Twin Contact Controls.



Also Available Without  
Integral Fused Line Switch

# *Twin Contact Controls*

**PERFEX CORPORATION**

500 West Oklahoma Avenue, Milwaukee, Wisconsin

# MONCRIEF

## FURNACES Meet Every Requirement

### for DEFENSE HOUSES

★ You can meet defense housing specifications at every point with the new specially designed Moncrief Furnaces. They have everything called for in sizes, efficiency, appearance and price. You can bid successfully for defense housing business and turn a fair profit.

These Moncrief Furnaces have the quality and construction to fully meet present day needs and give their owners many years of dependable service.

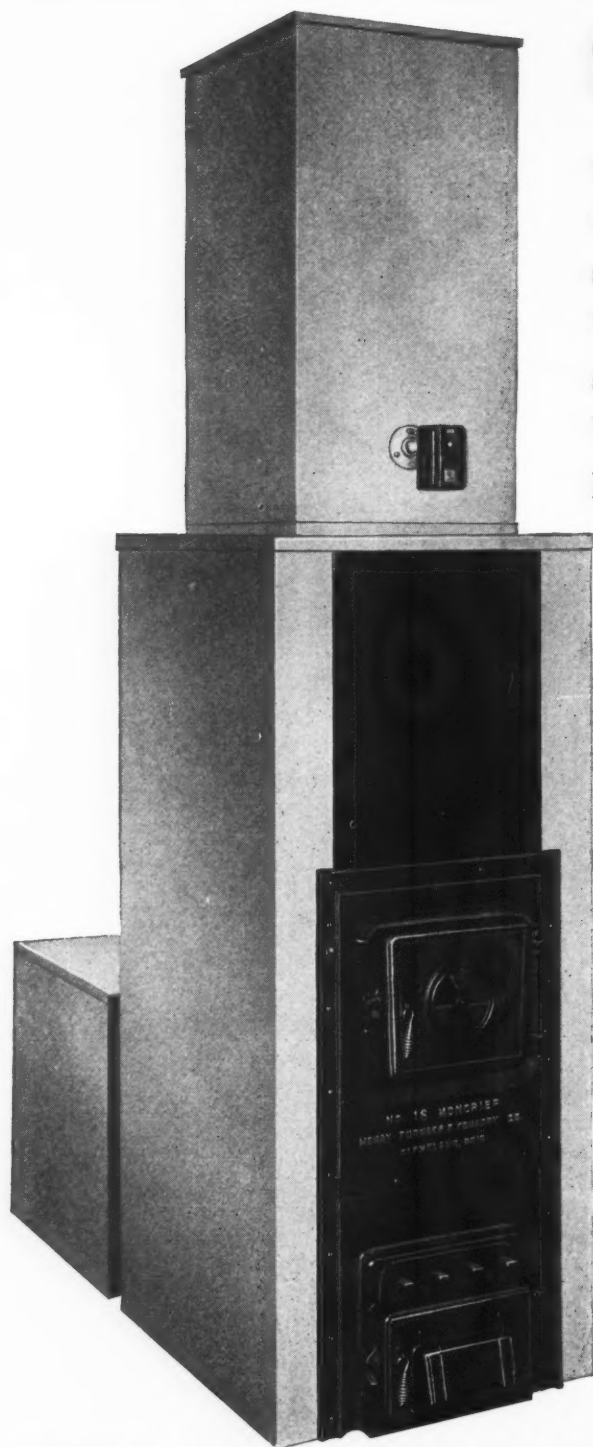
#### ← No. 16 CAST FORCED AIR Furnace

Cast 16" furnace with dome radiator. Very compact and efficient; 60,000 B. t. u. at registers; cabinet 26" x 26" x 7'3" high; blower cabinet 24" x 24". Electric driven blower produces forced air circulation, adapting it to basementless homes. Attractively finished. Priced right down to rock bottom.

#### SERIES C CAST →

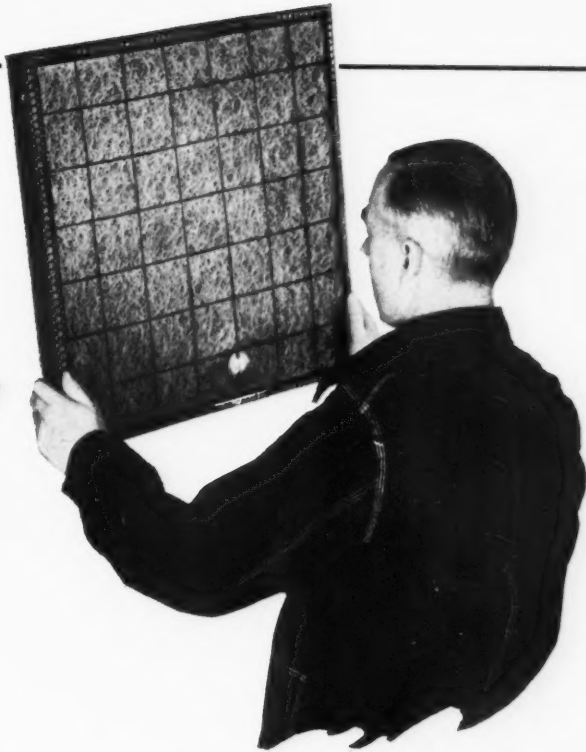
Here's top quality with the famous Series C design and construction in 18", 20" and 24" sizes—sections cast in one piece (two-piece firepot) heavy and smoothly finished; duplex roller-bearing grates, and all other fine features you expect in a high-grade furnace.

*Send for circulars and prices.*



THE HENRY FURNACE & FOUNDRY CO., 3473 EAST 49th STREET, CLEVELAND, OHIO

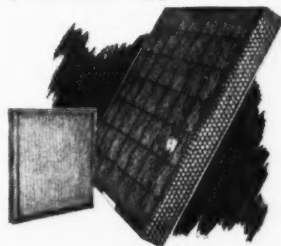
"...look  
THROUGH a  
Tampico!"



**L**OOK AT a Tampico and you'll understand the reason for its extra strength and longer life. Look **THROUGH** a Tampico and you'll see why it does a better filtering job... right from the minute it's installed! You'll see a density that is perfectly uniform throughout the entire area of the filter. No extra dense spots to block air passage—no extra thin spots to permit air leaks. "Precision Density Control" is typical of Tampico's advanced engineering... is still another reason why Tampico's popularity continues to climb!

### WELDED ALL-STEEL FRAME

The back and four sides of the Tampico all steel frame are spot-welded into a single husky unit that is dip-painted after completion. "All-over" perforations permit perfect circulation at every point. This rugged construction permits repeated



tappings or cleanings—means that ultimate dirt-clogging is postponed—that filtering efficiency is s-t-r-e-t-c-h-e-d.

### \$7.20 EXTRA DEALER PROFIT

Used Tampico Filter Frames are worth money. Instead of throwing them away, snip the wires, remove the Filtering Material and pack the empty frames (in reasonably good condition) into their original or other discarded cartons. When you have a minimum freight shipment, return them to us. **WE'LL PAY FREIGHT**

**CHARGES AND WE'LL PAY YOU 5c FOR EACH FRAME RECEIVED.** Help conserve materials for the war effort, and help yourself to an **EXTRA \$7.20** profit per gross.

★ ★ ★

Tampico's superiority is demonstrable—you can **SEE** it. That means they're easier to sell. They make friends and repeat customers, and they make **EXTRA** profit for the Dealer who sells or installs them. Send the coupon and see for yourself! Chicago Filter Co., Joliet, Illinois.

### SEND THE COUPON and

"...look **THROUGH**  
a **Tampico!**"

Chicago Filter Co., Joliet, Ill.

Gentlemen: I'm willing to look. Send me a free sample Tampico Filter.

Name .....

Address .....

City ..... State .....

## TAMPICO FILTERS

"The World's Largest Exclusive Air Filter Manufacturers"

THESE 2 SIZES OF

# SKILDRILL

ARE A "MUST" IN EVERY DEFENSE PLANT!

Now, more than ever before, you need these two modern SKILDRILLS to punch holes in every bottleneck . . . to speed your production flow! There's extra power, extra speed, extra ease of handling built into these two compact SKILDRILLS . . . for precision production drilling, for installation or assembly work in plants building aircraft, tanks and all other defense equipment. Ask your distributor to demonstrate these SKILDRILLS on your own work. Once you see how they perform, you won't be without them!

**SKILSAW, INC.,** 5029 ELSTON AVE., CHICAGO  
 New York, Boston, Buffalo, Philadelphia,  
 New York, Detroit, Kansas City, Atlanta,  
 Cleveland, Los Angeles, Oakland,  
 New Orleans, Seattle, Toronto, Canada

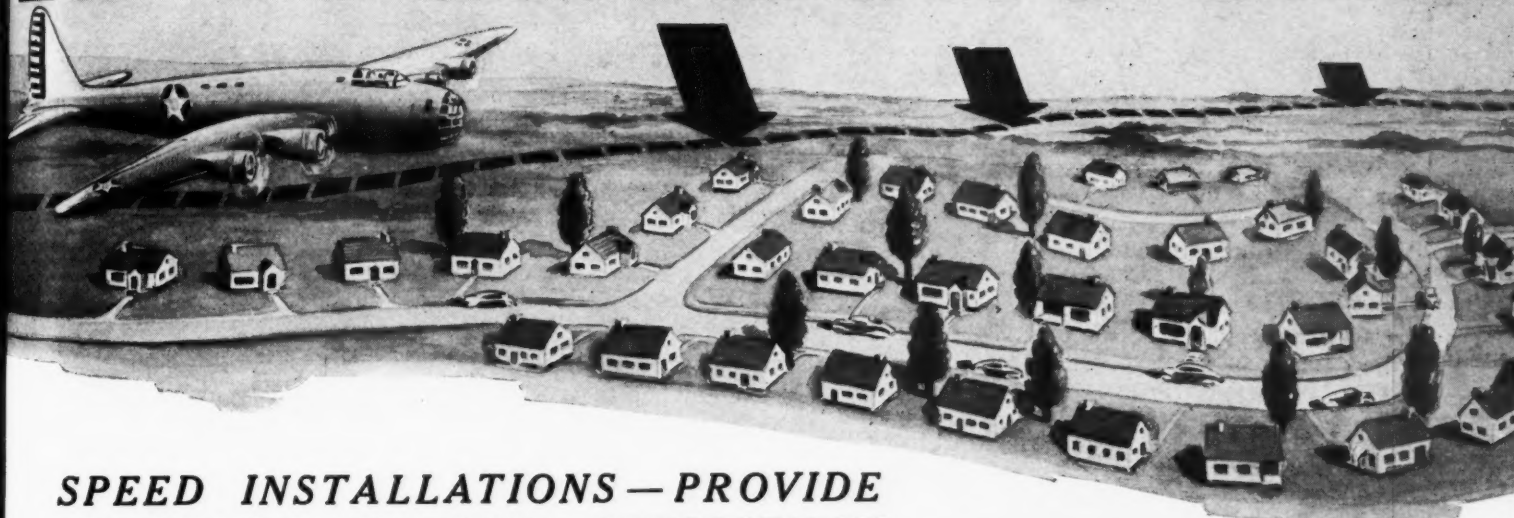
**SKILDRILL Model 80**  
 Capacity  $\frac{1}{2}$  in. in steel,  
 $1\frac{1}{4}$  in. in wood. Only  
 11  $\frac{1}{2}$  in. long, 3  $\frac{1}{2}$  in.  
 wide, weighs only 8  
 lbs. Gets into tightest  
 places.

**SKILDRILL Model 45**  
 Capacity  $\frac{1}{4}$  in. in  
 steel,  $\frac{1}{2}$  in. in wood.  
 Only 6  $\frac{5}{8}$  in. long,  
 weighs only 2  $\frac{3}{4}$  lbs.  
 Fits the palm of  
 your hand.

# SKILSAW PORTABLE ELECTRIC TOOLS

★ FOR THE DEFENSE OF AMERICA ★

# WAR HOUSING IS YOUR FRONT LINE



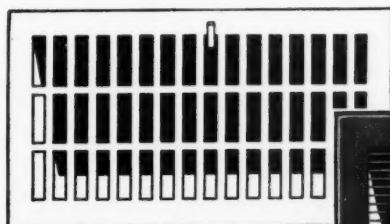
**SPEED INSTALLATIONS — PROVIDE  
MAXIMUM HEATING EFFICIENCY  
WITH**

## U. S. REGISTERS

★ ★ ★

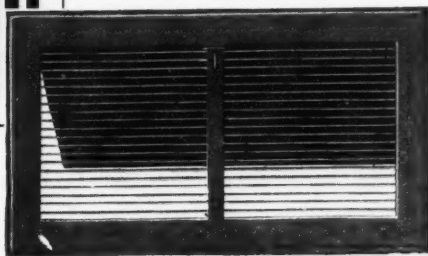
### No. 40 Series GRAVITY BASEBOARD REGISTERS

U. S. No. 40 SERIES Gravity Baseboard Registers are acclaimed by heating contractors "Superior to any type of register they have ever set." Non-Vision, Two-Piece Construction, Maximum Capacity, Minimum Resistance, with Metalac Finish at Black Japan List—make them the LEADER in the nation's new war time housing.



U. S. Louver-Type Air-Conditioning Registers are rapidly superseding All Punched Types because of the Few Cents Difference in Cost.

*It costs about 15c a Register Opening*



No More. About \$1.35 per job to Use a Horizontal-Bar U. S. No. 153 Louver-Type Register that is Non-Vision and Directional-Flow.

Directional-Flow Air-Conditioning Registers have been Reduced to these Low Cost Levels.

*New U. S. Stream Lined Production Made  
This Possible.*

Send for 41G and 41AC Catalogs Today

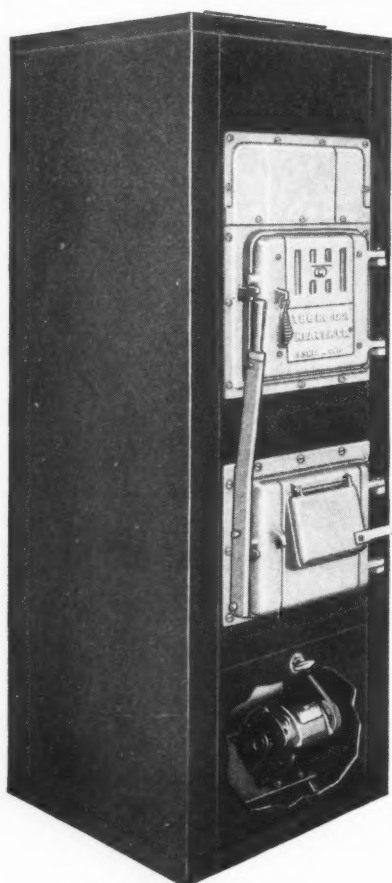


## UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

# RYBOLT



## New RYBOLT Forced Air Units Specially Designed *for War Housing*

To meet the restrictions of size and price RYBOLT offers three new coal-fired forced air heating units specially designed for War Housing. These units are unusually compact to fit into small space, yet have ample heating capacity and efficiency for small or even medium sized houses.

They are thoroughly modern in design with cabinets attractively finished in baked enamel. Convenient and economical to operate, easily accessible to service. Cabinets are attractively finished in baked enamel.

It will pay you to investigate these compact, good looking, thoroughly dependable units, priced low enough to give you the edge on competition. Literature and complete information on request.

### RYBOLT SERIES DH-61SV HI-BOY FORCED AIR UNIT

Unit shown above is unusually compact. Takes only 26" x 26" floor space. 72" high. Steel coal-fired heating element, welded construction. Blower underneath heating element. Baked enamel finish.

### RYBOLT SERIES DH 61-S FORCED AIR UNIT

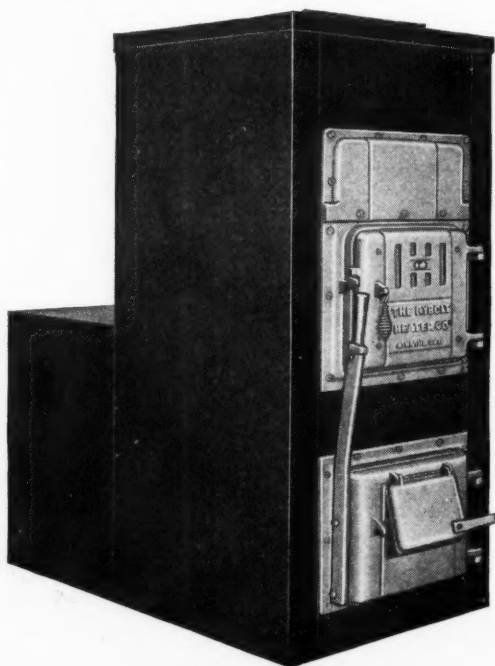
Shown at right. Compact. Takes only 26" x 43" floor space. 58" high. Coal-fired heating element of steel welded construction. Blower compartment can be mounted on either side or rear as shown. Cabinet finished in baked enamel.

### RYBOLT SERIES DH-70S FORCED AIR UNIT

A larger capacity unit than the one above but takes only 26" x 46" floor space. 62" high. Coal-fired heating element of steel welded construction. Blower compartment can be mounted on side or rear of cabinet. Cabinet finished in baked enamel.



**Write for Details of the RYBOLT War Housing Sales Plan which will Develop Worth While Business for You**



**THE RYBOLT HEATER COMPANY**  
615 MILLER STREET • ASHLAND, OHIO



## The Furnace Limiting Order

### The Scope of the Order

AS this issue goes to press the industry is expecting the announced furnace limiting order. We must wait the receipt of the official order for the details. Until an official order is released we will not be in a position to discuss the effects of the order.

### Proposed Limitation Order

- (1) Manufacturers who in the calendar year 1940 produced 8,000 or fewer furnaces will be permitted to manufacture, in the calendar year 1942, 90 per cent of their 1940 tonnage of iron and steel used.
- (2) Manufacturers who in the calendar year 1940 produced more than 8,000 furnaces will be permitted to manufacture, in the calendar year 1942, 50 per cent of their 1940 tonnage of iron and steel used.

The above tonnage limitations include furnaces for all requirements and repairs. That is for Army, Navy, Lend-Lease, Maritime Commission, privately and publicly financed defense housing, replacements and repairs.

Both gravity and forced warm air units are included. In connection with forced air, the tonnage used in blowers including motor, we understand, is included. There is no guarantee that manufacturers will be able to obtain all of the material to manufacture within the above limitations. Tonnage used in steel shells and radiators purchased by cast furnace manufacturers is, we understand, included in the cast manufacturer's tonnage.

THE announcement published above is the substance of the long expected—and in some quarters dreaded—limitation order on the furnace industry.

While the final results are still clouded, it may not be amiss here to study some of the implications and possible consequences of this order on the furnace heating industry.

No question but that this order is drastic—that it definitely curtails some of our activities but it is our belief that until we know for certain what will happen there is no cause for such reported reactions as locking the doors of factories and shops. At the same time, if the productive facilities of this industry can be converted to direct war products, everything possible to do along these lines should be done without forgetting, of

course, that furnaces and heating equipment are war products.

This industry produced and presumably installed in 1941 close to 600,000 furnaces—gravity and forced air; coal, oil, gas; steel and cast iron. In 1940, it was conservatively 500,000.

If the order is applied as stated above some members of the industry have estimated that in 1942 less than two dozen manufacturers who produced above 8,000 units will be given enough material to manufacture about 118,000 coal fired, gravity and forced air, cast iron and steel furnaces. The manufacturers on government records who produced less than 8,000 units will make some 67,000 furnaces. To this should be added about 25,000 more furnaces produced by manufacturers who up to now have made only oil and gas-fired units and who may be expected to convert some portion of their facilities to coal units.

The total, then, is somewhere around 200,000 furnaces for 1942, to which can be added those furnaces carried over in stock from 1941 and for which no new 1942 material allocations will be required. It should also be borne in mind that more units will come from the same amount of material as a result of more streamlined design and use of lighter metals since 1940. So, we feel that far more than 200,000 furnaces will result from this order.

As we interpret the order, these 200,000-odd furnaces must take care of all new houses—whether government or privately financed; also all replacements; also Army, Navy, etc.

That 200,000 or 300,000 furnaces will satisfy this combined market is open to serious question.

We know that while WPB and some agencies are setting definite limits on the amount of plate and pig we will be given—limiting us to 200,000 furnaces, the same WPB has recently granted priority aid for 350,000 new war workers' houses made up as follows—150,000 built with government funds; 200,000 built with private capital. And housing agencies still estimate that for the whole year of 1942 there will be required 525,000 such houses.

We also have been told that Washington recognizes the fact that under normal conditions there will be at least 160,000 furnaces which will go to pieces this year and must be replaced be-

cause they cannot be repaired.

And we know that several thousand furnaces will be required for barracks.

The total of these needs, then, is some 500,000 or more heating plants.

We have reported repeatedly that the demountable houses involved in the government-financed program will be heated with floor furnaces and circulating heaters. We also have shown that certain units in the government-financed houses will also use floor furnaces or circulating heaters. And, of course, many of the privately-financed very small houses will use floor furnaces or circulating heaters. So these must be deducted from our figures on furnaces. With all such deduc-

tions, though, there is no way in which we can reconcile 200,000 furnaces with essential needs of 1942.

This industry, through its representatives in Washington, has consistently called attention to the danger of making American home owners use hazardous equipment. Hazardous equipment means fires, gassing, too-high fuel bills, and uncomfortable conditions. We believe this danger should be impressed again and again.

It is our belief that a sensible attitude is this—we all realize that the undivided hope of every citizen is to win this war as quickly as possible, regardless of the cost. Our industry and home

*(Continued on Page 94)*

## PD-1X, Jobbers Inventory Control

**P**Riority problems of distributors and jobbers will be simplified by the use of a new application form which has been designed for their special use. The new form, to be known as PD-1X, will be available soon after the first of April.

Insofar as materials and supplies can be made available without interfering with the war effort, priority assistance will be given to distributors who apply on the new form so that they can keep sufficient stocks on hand to maintain essential productive and service industries in operation.

In recent months, distributors have been hesitant to make deliveries to users who cannot furnish priority rating certificates, because the distributors were afraid that they would not be able to replace the material in their own inventories. Use of the new form will enable distributors to request preference ratings for essential supplies without receiving or extending a rating on every individual order which they fill.

Jobbers who purchase the following supplies from producers will be entitled to apply for preference ratings on Form PD-1X:

- Builders Supplies.
- Construction Supplies.
- Electrical Supplies.
- Hardware Supplies.
- Industrial Supplies.
- Plumbing and Heating Supplies.
- Refrigeration Supplies.
- Welding and Cutting Supplies.

Distributors who use Form PD-1X will be required to furnish information on their sales and inventory of the types of material for which priority assistance is requested. Ratings will be assigned on the basis of the importance of the product, the use to be made of it by the distributors' customers, and the availability of the materials required.

Distributors should also furnish information showing the percentage of material shipped out of stock on rated orders during the preceding month or second preceding month, as compared with total sales, if such information is available. The distributor should also give any pertinent information as to where he sells the products he distributes, such as: to retail stores serving farms; to workers using tools in defense plants, etc. Where need is based on seasonal demands, the distributor should show his seasonal purchases in 1941 as a basis for his application.

A uniform system for assignment of ratings will be developed in cooperation with the various industry and materials branches concerned so that all distributors handling the same types of products for the same classes of customers will receive similar ratings.

Use of the new form is not expected to cover all of distributors' requirements for priority assistance. When a distributor fills an order bearing a priority rating for a substantial quantity of material, he should extend the rating to his producer instead of applying for a new rating on Form PD-1X. The new form is intended rather to enable distributors to keep their inventories of parts and products sold in small quantities up to a practicable working minimum.

For example, a distributor of hardware supplies to retailers in a Defense Housing critical area may receive a large number of small orders for hammers and other hand tools which will be used by workmen engaged in defense housing construction, but it would be difficult or impossible for the retailer to furnish him with a priority rating on each order. In such a case, the distributor could apply for priority assistance to replenish his inventory by using PD-1X, and the required priority assistance would probably be granted.

A new order, to be known as L-63, limiting the size of inventories which may be maintained by distributors, will be issued and published before the new PD-1X forms are made available for use, and the quantities of items for which priority assistance will be granted on the basis of PD-1X applications will be subject to the terms of this order.

After the new forms become available, distributors, wholesalers, and jobbers will be required to use them exclusively in applying for priority assistance. When a rating or ratings are authorized in connection with a PD-1X application, they may be applied on distributors' orders to producers by a simple form of endorsement on the purchase order containing the serial number of the approved application. Ratings authorized for specified quantities of materials may be applied to more than one purchase order placed with different suppliers, provided that the total quantity to which the rating is assigned is not greater than the total amount authorized. Suppliers and producers to whom the rating is extended in this way may re-extend the rating to obtain materials which will be physically incorporated into materials or products to be ultimately delivered to the distributor in accordance with the terms of the certificate.



## BITS and PIECES

### RECORD YOUR REPLACEMENTS

**T**HERE IS a possibility that if the war lasts long enough, the furnace industry may find the replacement and repair market to be our only source of sales.

Under such a situation we may have to prove that replacement of old, heavy furnaces by new, lighter weight furnaces is advantageous to the war effort.

Why advantageous? Because old furnaces ran approximately 25 per cent heavier than modern units; therefore replacement adds an additional 25 per cent of material as scrap to our national scrap pile over the amount of material required to manufacture a new furnace.

Contractors can help compile the figures needed to prove this point if they will keep a record of every old furnace scrapped—by weight—plus the weight of the new unit installed. Keep these figures according to actual owner name and location so that you can produce the figures in a hurry when needed.

Along this same line dealers can do a second service by keeping some sort of a record of their difficulties in obtaining replacement parts for old furnaces which need repair. Show how many sources of supply you had to contact to get the part and how long it took to get delivery.

### CONSERVE STOVE PIPE

**P**LUMBING and Heating Branch of WPB is urging home owners to save their stove and smoke pipe when they take the pipe down this spring for storage or cleaning.

Suggests WPB—"pipes should be wrapped carefully and stored in a dry place. Before storing clean with a stiff brush both inside and outside surfaces. If the surface is scratched, clean the area around the scratch carefully with sand paper. Coat the pipe with a good heat resistant paint. After the paint is dry, cover all surfaces with heavy oil or grease or paraffin. Finally, wrap the pipe carefully in paper, preferably wax paper—and store. Any pipe sections beyond repair can be replaced—probably—but every section which can be used should be saved."

This release probably won't reach the eyes of many home owners; further, many owners will disregard the advice. There seems, therefore, a splendid chance to offer the public and the government a service this spring and summer whenever you do a cleaning job—set up a service in which you can do the cleaning, painting, oiling and wrapping.

If you are looking for an argument for cleaning, why not use the government's own recommendation

as a talking point why you should be given the job of cleaning the furnace and putting the smoke pipe in proper storage. It may also be that this year you can recommend taking down the furnace smoke pipe where the furnace is not used in summer; cleaning the pipe, preparing the sections for storage and picking out a dry place where the pipe will be safe from rust. At the same time you can determine how many new sections are needed and have the summer to get the replacements.

### WHO IS A MANUFACTURER?

**I**N ANSWER to a letter asking if a contractor is or may be a manufacturer and thereby qualified to maintain material stocks under PD-25A or X we have received the following clarification from WPB.

Any firm whose sole business is the installation of furnaces and the fabrication and erection of the duct work used with these furnaces is considered a contractor and may NOT seek priority assistance under the P-90 Order or the Production Requirements Plan.

However, a manufacturer of furnaces who ordinarily furnishes his dealers with duct work along with his furnaces may seek priority assistance for all of his requirements under this plan.

If a contractor, as defined above, should obtain a contract to fabricate a sheet metal product (for instance, motor housings) then he may file under PD-25 A or X for that portion of his business in which he is engaged as a manufacturer.

### NAILING DOWN THE TRAILER

**M**OST readers who live near or have visited one of our new, large war equipment plants probably have carried away pictures indelibly painted on their mind. The editor's picture is one of acres of trailers, stretching row after row across a sea of mud, with miles of ductboard walks from road to trailer door—a profound impression of American industrial workers marching to war.

Well it now has occurred to Washington—as, indeed, it must have occurred to many readers a long time ago—what a waste of good tires.

While we have speculated, Washington has acted. Henceforth the buyer of a trailer will have his trailer delivered to him on its own tires, but once set in place and blocked up—off come the tires.

They are returned to the trailer manufacturer's factory to carry another trailer to another war worker. Trailer manufacturers may henceforth buy one set of tires for every five trailers manufactured.

Maybe this lack of tires will keep workers in place—something socialistic panaceas for unrest, even all-time high wages have been unable to do.

Incidentally, the House Trailer Section of WPB is working on a wood tire for use on wood wheels and a steel rim to use over an old rubber tire. If these work, trailers will be delivered a la wagon wheel and the buyer permitted to keep his tires.

### NEW HOUSING SETUP

**I**N THE May issue (next month) Arnold Kruckman will report in detail on the new FNHA (Federal National Housing Agency) which now  
(Continued on Page 95)

# "P-84 Will Insure Maintenance and Repair"

Says W. Walter Timmis

"THE importance of maintaining existing plumbing and heating facilities is recognized in this order, but because the plumbing and heating industry is chiefly a metal consuming industry, every effort must be put forth to keep consumption of critical materials at the irreducible minimum.

"In other words, this order is not a guarantee that existing plumbing and heating facilities will be maintained in exactly their present state. For instance, a heavy brass chrome plate shower mixing valve would not be replaced by one of the same type. In normal times it has often been found that it is cheaper to replace than to repair.

"Replacement now can be made only if there is no possibility of repair. In cases where replacement is essential it will be found that the items now being produced are severely limited in number of types and styles, that the weight has been reduced, and that in many cases, less critical materials are being used in place of the customary materials.

"The intent of this order is not only to insure maintenance and repair, but also to insure that the products made available for that purpose are used only for essential maintenance and repair.

"Heating equipment is defined as any primary heating unit used to provide building warmth or any accessories of such unit.

"Emergency repairs are defined as those required by actual or imminent break-down of plumbing or heating equipment. It includes the emergency replacement of equipment which is worn-out or damaged beyond repair. It does not include installation of superior type equipment or substitutions more extensive than required to replace worn-out parts.

"Other provisions of the Order are:

"1. The A-10 rating may be applied by a simple indorsement on purchase orders or contracts.

"2. Installers may not apply the rating to obtain delivery of materials on earlier dates than required to enable them to make emergency repairs.

"3. A supplier may not apply the rating if he can make his delivery and still maintain a minimum working inventory.

"4. The A-10 rating is applied automatically in the case of delivery to an installer of any plumbing and heating item, the cost of which is less than \$5, provided that the total order placed by the installer is less than \$10.

"Such deliveries to which the rating is automatically supplied must be actual and *bona fide* purchases for less than \$5. Similarly the over-all order must be for less than \$10. Larger orders may not be broken down so as to bring them, by subterfuge, within the terms of this provision.

"5. In the case of units costing more than \$50, and worn-out or damaged beyond repair, the installer must attach to the purchase order a statement signed by him and by the ultimate user, certifying that repair is impracticable, and specifying the points at which the unit failed.

"6. Provisions of Priorities Regulation No. 1 are made applicable.

"Order P-84 is designed to fill a gap in the application of orders currently existing for repair and maintenance needs. Preference Rating Order P-100, for instance, assigns an A-10 rating for repairs and maintenance items but may not be used to secure repairs for retail or residential properties.

"The new order, although making the A-10 rating extendible to all suppliers, including the manufacturer, does not permit the manufacturer himself to extend the rating. A manufacturer desiring priority aid to secure materials for supplies sold under P-84 must still use the Production Requirements Plan or the modified PRP."

## P-84—Our Maintenance and Repair Order

1022.1 PREFERENCE RATING ORDER. For the purpose of facilitating the acquisition of material entering into the Emergency Repairs of Plumbing Equipment and Heating Equipment (as hereinafter defined), a preference rating is hereby assigned to deliveries of such Material upon the terms hereinafter set forth.

(a) **Statement of Policy.** It is the purpose of this Order to effectuate the policy of the War Production Board of making available materials required for plumbing and heating emergency repairs necessary to maintain minimum heating and sanitary conditions required for public health in the United States, its territories and possessions, without expansion or improvement of facilities, except where duly authorized or approved. The terms and conditions of this Order are to be interpreted in conformity with this expressed policy.

(b) **Definitions.**

(1) "Plumbing Equipment" means any equipment, fixtures, fittings, pipes, accessories or supplies of types used in, or connected to, water, sewer, or gas systems, regard-

less of whether or not connected with a central system, provided that "Plumbing Equipment" does not include any tools for use in installation of repairs, or any hoses, sprinklers or other devices of types commonly attached to outdoor faucets.

(2) "Heating Equipment" means any primary heating unit used to provide building warmth and any accessory or appurtenance used in connection with such a primary heating unit.

(3) "Emergency Repairs" means only those remedial repairs which are required by actual or imminent break-down of Plumbing Equipment or Heating Equipment. It includes (but is not limited to) the emergency replacement of equipment which is worn out, damaged beyond the repair or destroyed. It does not include the installation of superior type equipment to replace useable equipment, or a substitution more extensive than that which is necessary to replace the part or parts that are worn out, damaged or destroyed.

(4) "Installer" means any person who installs Plumb-

ing Equipment or Heating Equipment, regardless of whether or not he is regularly engaged in installing such equipment.

(5) "Supplier" means any person

(i) who supplies Material which he has not in whole or in part manufactured, processed, assembled or otherwise physically changed (in some way other than by cutting or threading pipe), and

(ii) with whom a contract or purchase order has been placed for delivery of such Material to the Installer or to another Supplier.

(6) "Material" means any commodity, equipment, accessory, part, assembly or product of any kind.

(c) **Assignment of Preference Rating.** Preference Rating A-10 is hereby assigned subject to the restrictions and conditions of paragraphs (e) and (f) hereof:

(1) to deliveries, to an Installer, or Material required by him for Emergency Repairs.

(2) to deliveries to any Supplier, who has received an order or contract to which the preference rating hereby assigned has been applied, of Material which will be delivered by him or another Supplier to the Installer pursuant to such rated order or contract, or will be physically incorporated into Material which will be so delivered; or which will be used, within the limitations of paragraph (e) (3) hereof to replace in such Supplier's Inventory Material so delivered.

(d) **Persons Entitled to Apply Preference Rating.** The preference rating hereby assigned may, in the manner and to the extent hereby authorized, be applied by:

(1) the Installer;

(2) any Supplier of Material to the delivery of which the preference rating has been applied as provided in paragraph (f).

(e) **Restrictions on Use of Rating.**

(1) **Restrictions on Installer and Supplier.** No Installer or Supplier may apply the rating hereby assigned to obtain copper or copper base alloys which have been fabricated into sheets, wire, rods or tubes, or to obtain any scarce Material the use of which could be eliminated without serious loss of efficiency by substitution of less scarce Material or by change of design.

(2) **Restrictions on Installer.** The Installer may not apply the rating to obtain delivery of Material or earlier dates than required to enable him to make Emergency Repairs.

(3) **Restrictions on Supplier.**

(i) No Supplier may apply the preference rating hereby assigned to obtain Material in greater quantities or on earlier dates than required to enable him to make on schedule a delivery rated hereunder or required to replace in his inventory Material so delivered. He shall not be deemed to require such Material if he can make his rated delivery and still retain a practicable working minimum inventory thereof; and if, in making such delivery he reduces his inventory below such minimum, he may apply the rating only to the extent necessary to restore his inventory to such minimum.

(ii) A Supplier may defer application of the rating hereunder to purchase orders or contracts for Material to be placed by him until he can place a purchase order or contract for the minimum quantity procurable on his customary terms; **provided**, that he shall not defer the application of any rating for more than three months after he becomes entitled to apply it.

(iii) A Supplier may apply the preference rating herein assigned only to obtain deliveries of Material which he will resell without manufacturing, processing or otherwise changing physically (other than by cutting or threading pipe) to fill a purchase order or contract rated hereunder or which he will use within the limitations of paragraph (e) (3) (i) hereof, to replace in his inventory Material so sold.

(f) **Application of Preference Rating.**

(1) An Installer or Supplier, in order to apply the preference rating to deliveries of Material to him, must

endorse the following statement on the original and all copies of the purchase order or contract for such Material, manually signed by a person duly authorized for such purpose by such Installer or Supplier:

"Material for Emergency Repairs of Plumbing Equipment or Heating Equipment—Rating A-10 under Preference Rating Order No. P-84 with the terms of which I am familiar."

Name of Installer or Supplier.

By: \_\_\_\_\_

Such endorsement shall constitute a certification to the War Production Board that such Material is required for the purpose stated and that the application of the rating is authorized by this Order. Any such purchase order or contract for such material shall be restricted to Material which is rated in accordance herewith.

(2) The Provisions of this Order relative to application of a preference rating by the Installer shall not apply in the case of delivery to an Installer or any plumbing or heating repair item, the cost of which to the Installer is less than \$5.00, provided the Order placed by the Installer totals no more than \$10.00. All such deliveries are deemed to be for repair purposes and, subject to the restrictions of paragraph (e) hereof, the Supplier may apply the rating hereby assigned to replace the stock so delivered.

(g) **Records.** In addition to the records required to be kept under Priorities Regulation No. 1, the Installer and each Supplier placing or receiving any purchase order or contract rated hereunder shall retain, for a period of two years, for inspection by representatives of the War Production Board, endorsed copies of all such purchase orders or contracts, whether accepted or rejected, segregated from all other purchase orders or contracts filed in such manner that they can be readily segregated for such inspection.

In the case of replacement of a unit which has been worn out, damaged beyond repair or destroyed, the cost of which unit to the Installer exceeds Fifty Dollars (\$50.00), the Installer shall attach to each copy of the purchase order for a delivery rated hereunder, a statement signed by the ultimate user and by the Installer, which statement shall certify that repair of the unit is impracticable and shall specify:

(1) the unit being removed,

(2) the part or parts of such unit which failed.

(3) the age, model, make, size and serial number (where available) of such unit or parts,

(4) The replacing unit, its model, make, size and serial number (where available).

(h) **Reports.** The Installer and each Supplier, who applies the preference rating assigned hereunder, shall file such reports as may be required from time to time by the War Production Board.

(i) **Exception: Parties to whom other repairs and maintenance orders are applicable.** The preference rating herein assigned shall not be applied by any person to deliveries of repairs and maintenance items to which deliveries any other Order has assigned a preference rating.

(j) **Communications to War Production Board.** All reports required to be filed hereunder, and all communications concerning this Order, shall, unless otherwise directed, be addressed to:

"War Production Board  
Washington, D. C., Ref.: P-84."

(k) **Violations:** Any Person, who wilfully violates any provision of this Order or who by any act or omission falsifies records to be kept or information to be furnished pursuant to this Order, may be prohibited from receiving further deliveries of any Material subject to allocation, and such further action may be taken as is deemed appropriate, including a recommendation for prosecution under Section 35 (A) of the Criminal Code (18 U. S. C. 80).

(l) **Revocation or Amendment.** This Order may be  
(Continued on Page 92)



Left—James E. Wilson, Manager, Michigan office, WPB and, right, T. I. Easton, Assistant.

**B**RIEFLY defined, the purpose of the War Production Board Priority Orders now in force is to obtain first things first. By the same token this means last things last and it is from this phase of the activity that most of the complaints and problems arise. The American public, particularly industrialists, contractors, retailers, jobbers, all are in agreement that the foremost problem is to win the war and seemingly most men in business are willing to subscribe and comply with regulations which enable us to produce first things first.

As a consequence of the war, American industry is finding that an ever increasing percentage of our industrial capacity and manpower and materials are required to prosecute this war. Coupled with this is a shortage of certain materials which we have heretofore obtained from distant lands. The overall result of this is that certain materials are not obtainable for normal use as the available supply is completely required for our war effort. Industry, therefore, must find substitutions for these scarce materials or must make every effort to conserve these materials by eliminating luxury or non-essential items.

This scarcity of materials and the need for war production has resulted in the establishment of the War Production Board's Priorities Division through which necessary orders and regulations are issued to conserve materials and to allocate available materials to all users. The situation is not getting any simpler, it is getting more complicated month by month. This is plainly evident by the increasing number of materials becoming scarce and by the increasing number of regulatory orders.

#### M, P, L, E Orders

At the present time, there are in force priority orders in the M, P, E, L, and S series, which have been issued by the Priorities Division up to Feb. 28.

Described briefly, M orders regulate the distribution of materials. They place a control on commodities. P orders are preference rating orders which assign ratings which assist manufacturers or users in obtaining materials required for war production or essential civilian production. E orders regulate the distribution of equipment, including machine tools and cutting tools. L orders limit the production of certain items, especially consumers' durable goods. S

# Priority Orders Which Affect Our Industry

By James E. Wilson and  
T. I. Easton

Michigan Office, War Production Board

Many speeches have been made at this year's conventions on Priority Orders and procedure. But the explanation to the Michigan association by James E. Wilson and T. I. Easton covered the applications and orders with procedure so concisely that we here reproduce the speech as corrected by the authors.

orders penalize or restrict the activity of persons or firms who have violated priority orders.

Quite naturally, no one in industry is affected by all of these orders and, generally speaking, any one given industry is affected by only a limited number of these orders.

For the warm air heating and sheet metal contracting industries the preference rating orders which affect their activities are P-19-a, b, c, and d, P-55, P-90, and P-100. Application forms for priorities assistance include PD-1-a, PD-3-a, PD-25-a, PD-25-x, PD-105 and PD-200.

#### PD-105 Application for P-55

For privately financed defense housing, which is defined as housing built in a defense area selling for not over \$6,000 including the lot, or housing which will rent at a base figure of not over \$50 per month, application is made on Form PD-105. This form includes a bill of material list and is obtained from the local office of the FHA. The applicant obtains six copies of Form PD-105, completes them, and returns five copies together with a set of his plans and specifications, to the local FHA Office for processing.

The FHA local office determines eligibility in respect to area and estimated sales or rental price and checks bill of material submitted. The FHA may eliminate or reduce the quantity of material requested. After making these changes, the applicant is called in to initial such changes and the FHA then sends the original and three copies of the PD-105 Application to the local office of the Defense Housing Coordinator. Here the application is checked as to price and is also checked as to the status of the defense worker in cases where units are built by the owner.

The original and two copies of the PD-105 application are then sent to the local office of the Priorities Division of the War Production Board for final approval. The application is reviewed for any omissions or discrepancies and if everything is in order, the application is approved and a preference rating order P-55 is issued to cover the project.

P-55 order is made in duplicate and the original is sent to the applicant together with the approved copy of his application as well as a copy of Priorities Regulation No. 1. The original application is kept on file

in the local Priorities Division Office and the remaining copy of the application is sent to the Director of Analysis, Office for Emergency Management, in Washington. A report of the action taken on the application is sent to the local office of the Defense Housing Coordinator and the FHA. Upon such notice the local office of the FHA returns to the applicant the set of plans and specifications which he submitted at the time of his application.

#### **P-55 Order for Defense Housing**

The P-55 Certificate issued to the applicant shows the rating, the date of issuance and the date of expiration. In order to extend this preference rating the applicant must obtain additional copies of the P-55 order which he may do by photo-stating, mimeographing, or typing. Any reproduced copy should bear the statement that the copy is a true copy and who the copy was made by. The signature of the issuing officer should be properly typed in; manual counter-signature of the issuing officer is unnecessary for extension purposes.

The applicant serves a facsimile copy of his original P-55 to each of his sub-contractors or suppliers before expiration of the order. He then endorses on each of his purchase orders the necessary certification to tie that purchase order in with the Preference Rating Order. In turn, each supplier or subcontractor does likewise with each P-55 order received, so that eventually, the P-55 order is extended back to the manufacturer. P-55 orders may not be combined by suppliers into one purchase order. Under the P-55 Amended order which is expected to be released very shortly, purchase orders bearing the certification of the P-55 Amended order may be basketed into one order by suppliers. Another change which the P-55 Amended order is expected to incorporate is that of having purchase orders under the P-55 amended order sent to the local FHA office for authentication.

#### **PD-25A and PD-25X**

The manufacturer may not extend P-55 Amended rated orders received from his customers. Production Requirements Plan under which he is expected to operate will provide him with priority assistance in obtaining needed materials for manufacturing his products. Forms PD-25A or PD-25X may be used by the manufacturer in applying for Preference Rating Order P-90 which is the Preference Order issued under the Production Requirements Plan. PD-25A is the application form for the manufacturer whose sales volume exceeds \$100,000 a year. Form PD-25X is the application form for the manufacturer whose sales volume is under \$100,000. (These application forms were explained in detail in the February issue of the AMERICAN ARTISAN.) The Production Requirements Plan is set up on a quarterly basis and each quarter the manufacturer reports on his PD-25A or PD-25X his requirements for the next quarter. He should use P-55 orders received by him in setting up his schedule of his defense rated volume.

#### **PD-200 Application Public Housing**

Form PD-200 is the application form for preference rating for the construction of defense projects and publicly financed housing projects. Before such an application is approved it must be shown that the project is necessary to the defense effort or is needed for national health or safety. Application forms are obtained from the local office of the Priorities Division,

War Production Board, and upon completion are submitted to the Project Rating Section, War Production Board, Washington, D. C. These applications are given consideration in Washington by each commodity branch which controls the use of any of the material required for the project and upon approval a preference rating order of the P-19 series is issued.

Preference Rating Orders P-19, P-19-a, and P-19-b, are issued to cover the construction of defense projects. Preference Rating Order P-19-c was issued to cover publicly financed housing projects and has now been replaced by P-19-d. It is expected that this order will shortly be replaced by P-19-h.

#### **P-19 Order for Public Housing**

Upon receipt of one of the P-19 Preference Rating Orders, the applicant secures additional copies as explained in his particular order, executes the order by filling out the acceptance on the last page, sends one copy of the order to the Priorities Division in Washington, D. C., and one copy to each of his suppliers or sub-contractors. He then endorses his purchase order with the certification as laid down by the specific order under which he is working and ties that purchase order in with the Preference Rating Order. His sub-contractors or suppliers, in turn, re-extend the order in the same manner.

Army or Navy projects are covered by Preference Rating Certificates PD-3-a. This would be in those instances where plans have been drawn up by the Army or Navy and where the facilities will be owned by the Government. A PD-3-a Certificate is issued to the builder, who retains the certificate at all times. He then endorses the required certification on his purchase orders to his sub-contractors and suppliers and they, in turn, endorse the same certification on their purchase orders to their suppliers. Suppliers may basket PD-3-a rated orders of the same rating classification, but in their certification on such an order, they must show the serial number of each PD-3-a certificate included in the order.

#### **PD-1A Is the Catchall**

Form PD-1-a, which supersedes PD-1, is a general application form which may be used in those cases not covered by specific orders. The PD-1-a applications may be obtained from the local Priorities Division of the War Production Board and when properly filled out, are mailed to the Priorities Division, War Production Board, Washington, D. C. PD-1-a applications are filed by the user of the material. It may be used to apply for a rating on a replacement of a furnace or may be used to maintain stocks of repair items.

(Form PD-1-x, which is expected to be released shortly, will supersede Form PD-1-a on applications for maintaining inventories.)

Preference Rating Order P-84 released recently may be used by the installer to secure emergency heating and plumbing repair items.

When a Preference Rating is assigned to the PD-1-a application, one copy of the certificate is returned to the applicant by the Washington Office of the Priorities Division and the applicant retains such copy for his files. He then endorses the necessary certification on his purchase order and his supplier, in turn, places the same certification on his purchase orders in order to re-extend the rating. Suppliers may basket orders rated under PD-1-a where the rating is of the same classification, but in their certification on such an or-

*(Continued on Page 92)*

# Defense Developments

## Amended P-55

**E**XTENSION of preference ratings on defense housing projects by subcontractors has been simplified by an amended version of Preference Rating Order P-55.

The provisions of P-55 may be used only by contractors to whom a copy of the order is addressed with a serial number, and by the suppliers and subcontractors to which an individual order is specifically extended.

Under the order as now amended, suppliers who process the material they furnish to the contractor or subcontractor in any substantial way may not extend the ratings on orders which they fill. Instead, they should operate under the Production Requirements Plan (PD-25A or PD-25X).

However, exceptions are made in the case of subcontractors who commonly make minor changes in the material they install in defense housing projects. They will be permitted to extend ratings under specified restrictions.

All extensions of ratings by builders or subcontractors must be countersigned by an authorized agent of the FHA. Suppliers who do not process the materials they furnish to contractors may extend ratings without counter signature.

Another amendment permits extension of ratings by suppliers and subcontractors after the expiration date of the particular order under which the ratings were assigned, provided that the rating being extended was originally applied by the builder prior to the expiration date.

This provision will assist suppliers and subcontractors to take advantage of a new amendment which permits them to defer extension of ratings up to a period of three months, and to "basket" or accumulate ratings until they are able to place an order for a minimum quantity procurable on customary commercial terms.

## 45,000 Demountable Houses Bought

**T**HE Federal Works Agency, moving to meet the President's request for emergency shelter for war workers in defense areas, contracted for the purchase of 45,708 prefabricated, demountable houses within 45 days—a pace of better than 1,000 units a day, it is announced.

Contracts were negotiated with 57 fabricating firms.

## Metal Window Output Cut

**S**TRICT controls were placed by WPB March 25 on the production and distribution of metal windows.

The restrictions, contained in Limitation Order L-77, cover metal sashes, metal casements and other metal frameworks designed for window installations, and their accessories.

Effective March 25, manufacturers may make

metal windows only for orders which bear an A-2 or higher preference rating, or on which work has already begun.

In addition, manufacturers may not accept deliveries of material for use in window frames, except on orders bearing a preference rating assigned under the Production Requirements Plan.

Distributors may not sell or otherwise deliver metal windows except on orders bearing an A-10 or higher rating, or upon the direction of the Industry Operations Division.

During 1941 approximately 150,000 tons of metal, almost entirely steel, were used to produce an estimated 6,000,000 to 7,000,000 windows. The limitation order is expected to result in a saving of from 60,000 to 80,000 tons a year.

## Utility Maintenance Raised to A-2 and A-5

**T**HE War Production Board issued on March 26 a complete revision of Preference Rating Order P-46 which was issued last September to assist utilities in obtaining the minimum amount of materials necessary for maintenance, repair, and operation. That order assigned a blanket preference rating of A-10 to such materials.

The March 26 order makes several important changes, the principal of which are:

1. An A-2 rating is granted to deliveries of material for maintenance, repair, and operating supplies for power plants and pumping plants. An A-5 rating is granted for all other facilities, such as lines, pipes, and substations.

2. Line extensions to serve a new consumer are restricted to 250 feet. The original order permitted a 1,000-foot extension. Extensions begun prior to March 26, the date of issuance of this order, may be completed. The power branch of the WPB announced that houses for which the foundations were completed by March 26, may be served with electricity provided they are not more than 2,000 feet from an existing line and provided the utility specifies that galvanized steel wire will be used instead of copper.

## Revisions of PD-25A, PD-25X

**A**REVISED form of application for priority assistance under the Production Requirements Plan has been mailed to all companies now using the plan, to be used in filing their applications for the second calendar quarter of 1942. Copies of the revised Form PD-25A are available in WPB field offices or in the Production Requirements Branch, Bureau of Priorities.

The changes are largely technical, including requests for some additional information, and are designed both to assist the War Production Board in determining the materials requirements of American industry and to facilitate a more accurate assignment of ratings under the Production Requirements Plan.

Most important of the changes in the form is that

unfilled orders on the applicant's books as well as past shipments are to be reported, and will be taken into consideration in the assignment of ratings for specific quantities of materials for which priority assistance is granted. The change is embodied in Section D of the application form.

Applicants are now required to show in Section B a breakdown of shipments by classes of products and priority ratings. That is, an application covering two classes of products should show the volume of shipments of each class shipped on orders bearing ratings between AA and A-1-k, between A-2 and A-9, A-10, other ratings and no ratings at all.

In Section D, Part 1, applicants are advised to show separately on line 23 or 24 their unrated shipments of repair or replacement parts, since special consideration will be given to such shipments in determining the volume of materials for which the applicant is entitled to a rating.

Applicants are warned that the figures in Section E, column 8, should be estimates of the total amounts of materials which will be used during the quarter, whether from inventory or new receipts, and not estimates of materials to be purchased during the quarter.

A new page, Section E and F Supplement, gives the applicant an opportunity to break down his report of materials requirements, as shown in Section E and Section F, into the amounts of such materials required for making each class of the applicant's products.

## Oil Price Raise Approved

**A**N order, Amendment No. 4 to Revised Price Schedule 88 (Petroleum and Petroleum Products) was announced March 26 and raised maximum prices by the following amounts:

*Gasoline*— $\frac{1}{2}$  cent per gallon.

*Distillate fuel oils* (*Kerosene*, tractor fuels, range oil, Nos. 1, 2, 3, and 4 fuel oils, gas house oils, and distillate Diesel fuel oils)—0.4-cent per gallon.

*Residual fuel oils* (Nos. 5 and 6, bunker C, Navy grade, and residual Diesel fuel oils)—20 cents per barrel.

The permitted rise applied in Maine, New Hampshire, Vermont, Rhode Island, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida (east of the Apalachicola River), and the District of Columbia.

The raise was to compensate for higher hauling costs using tank cars instead of boats.

## Tin Plate

**T**ERMS of the "Tin Order" and its amendments have not been well understood. It seems that manufacturers can fabricate up to 50% of their tin stocks based on the year 1940. Also an order will be issued shortly prohibiting fabrication of tin sheets, with exception of certain items including tin cans. In other words, the use of tin for warm air heating will be prohibited. As you know, tin is not included in the new defense housing critical list. We also understand that the gauges and sizes of tin sheets used in the warm air heating industry cannot without a few exceptions be used for making items

which are permitted, as for instance, tin cans. Manufacturers with frozen stocks of tin plates should appeal to the Tin and Lead Sections, War Production Board, Temporary Building R, as to how their tin plate stocks can be disposed of.

**A**RMY, Navy, and certain other governmental agencies usually excepted must conform to a list of special restrictions on the use of tin, according to the terms of Conservation Order M-43-a, as amended March 18.

The restrictions on the use of tin are:

1. Lead base alloy, other than solder, must not contain more than 12 per cent tin by weight. The same rule applies to tin alloy.
2. Prior to May 1, solder may have a tin content of 38 per cent by weight. After that, the amount is reduced to 30 per cent.
3. Tin in *terne* for *terneplate* is limited to 15 per cent by weight and for long *ternes* to 10 per cent.

## Fuel Oil Restrictions

**T**O conserve stocks of fuel oil in coastal areas, installation of new fuel-oil burning equipment in 17 Eastern States, the District of Columbia, Oregon and Washington is discouraged by Limitation Order L-56, issued March 14.

The order forbids delivery of fuel oil for use in any new equipment unless installation is completed by April 15, or in any converted facilities unless the conversion is completed within 10 days. An exception is made in the case of new construction if foundations are completed within 30 days and if fuel-oil burning equipment is specified in the construction contract.

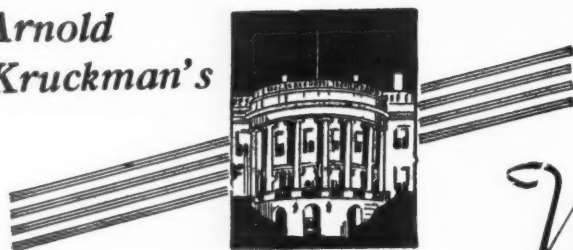
Consumers now using fuel oil are also forbidden to accept additional supplies unless they are making full use of standby facilities using fuels or power other than electricity or natural gas. Suppliers are not allowed to make deliveries of fuel oil to such consumers unless the standby facilities are being used to the fullest possible extent.

The order also provides that the Director of Industry Operations may examine fuel-oil burning facilities already installed, and suggest conversion for use of a less scarce fuel. After notice sufficient to permit such conversion, the Director of Industry Operations may forbid further deliveries of fuel oil to the consumer who fails to convert.

The order provides for appeals in cases where its terms might work special hardship. The order does not apply to use of fuel oil in internal combustion engines.

Order L-56 shall apply in the following areas:

Connecticut	Pennsylvania
Delaware	Rhode Island
Florida	South Carolina
Georgia	Vermont
Maine	Virginia
Maryland	West Virginia
Massachusetts	District of Columbia
New Hampshire	The states of
New Jersey	Oregon
New York	Washington
North Carolina	



## Housing and Heating Are In a Snarl

AT this writing, April 2nd, we are hourly expecting here in Washington a WPB order freezing all building and construction in the United States, except whatever is necessary for war areas and war purposes.

We are also expecting momentarily another WPB order freezing much of the materials and equipment required for plumbing and heating installations of buildings, among them furnaces. The order will halt *all distribution*, except to buildings in war areas, for war purposes.

### Socialistic House Construction

Under the new Federal Public Housing Administration, headed by John P. Blandford, Jr., the policy that prevailed under FWA Administrator Fleming is reversed. Fleming built to provide shelter for war workers as quickly as it could be constructed. Blandford, executing the recommendations of New Dealer Judge Rosenman, (the President's friend), plans to build along the lines of the USHA program, adapting broadly peacetime slum-clearance to war conditions. Under the present FPHA program the Federal Government furnishes the money and the local authorities boss the job.

### 350,000 House Need Is Ephemeral

The conventional figure currently used as a yardstick for prospective war area housing is 350,000 units. This is based upon the legal requirements in order that the funds provided by the new Lanham Act may be used. It is defined as 150,000 units built entirely by Federal funds and 200,000 built by "private" funds. Of course, these "private" funds are funds furnished by banks or other agencies upon guarantee by the Federal Government.

It seems safe to depend upon the certainty that at least 350,000 dwelling units will be built in war areas. But there is no assurance by any source in Washington that you can rest upon this certainty.

Apparently, under Blandford, the whole program is being revamped. You are cautioned by officials to bear in mind that human affairs are subject to sudden changes. New forms of housing may be devised. New methods of treating the war working population may be formulated. They may be required to leave their families at home and live on the job in dormitories. Or, it is suggested, the war may suddenly end. The chief idea they want you to get is that no one at this moment can tell how many dwellings may be required in war areas and that entirely new plans may be

evolved. This situation should make quite clear to you that it is actually true the shifts and changes in the Capital are so frequent, so sudden, and so uncertain, that there are very few persons, from the President down, who really have a firm notion about anything.

### War Housing for Post-War Conditions

In order to grasp the situation it is necessary to understand the newly reversed program of the new Federal Public Housing Administration. In essence it makes more of the social objectives as originally laid down by the New Deal, than it does of emergency housing. The new FPHA plan keeps in mind post-war needs. It tries to provide homes for war workers and to make those homes fit the needs of the post-war population. To all intents and purposes it takes over, lock, stock and barrel, the ideals and objects and methods of the USHA. FPHA is actually a very much enlarged USHA. The personnel has been drafted from all other housing agencies, but the men who run the business all are former USHA men.

Under Gen. Fleming only a few housing designs were adopted, contracts were negotiated by the swiftest method and the dwellings were built quickly, without regard to post-war ideas or local wire-pulling. Under Blandford local interests shall have a very important part in planning, building and setting up controls. So far as possible the 600 local housing authorities now in existence will be used to carry out the local program. Where there are no authorities it is purposed to secure their creation.

The local authority will hire the architect and engineer and the staff and will supervise their work; but the Federal Government will pay the bills. Technicians will have contracts with the Federal Government for their salaries and expenses, but they will report to the local authority which will act as agent for the Federal Government. The local set-up will formulate designs and plans, approved by FPHA, and the regional offices of FPHA will advertise for bids and award the contracts in open competition. These regional offices are located in Boston, New York, Chicago, Atlanta, Ft. Worth, San Francisco, and Detroit. If you have occasion to get in touch, look for USHA in San Francisco and Ft. Worth. In the other cities, ask telephone information for the location of the Federal Public Housing Administration.

At least theoretically the relation of the Federal Government to the local authority enterprise is expected to be routine formality. The contractor legally has a contract with the Federal Government, but he takes his orders and does his business with the

local authority. The Lanham Act emphasizes that war housing is designed as temporary shelter in order that it may be swiftly erected. Under this program, \$150,000,000 was set aside for demountable houses; and Rufe Newman, the FWA man, had launched an ambitious and effective drive to erect 46,500 prefabricated houses. There was also a sizable sum for dormitories and trailers. The contracts for the prefabricated houses were awarded and work has reached various stages of completion.

The Blandford school does not like factory-made prefabs. They prefer what they call "site-prefabrication", obviously an extension of the local idea. "Site-prefabrication" rests upon a shop with complete tools and machinery on the site, at which houses may be fabricated locally, by local people, redounding to local bank accounts. It will not disturb the new FPFA management seriously if the present holders of contracts for prefabricated houses fail to meet their schedule. Only some extraordinary circumstance would prompt more contract awards to prefabrication factories.

### Workers May Be Housed as Transients

It is anticipated the new program of dual supervision may slow down building. But any delay is not expected to interfere with war activities. If there are not sufficient dwellings in war areas the FPFA relies upon temporary facilities such as dormitories to house the actual workers, really barracks somewhat similar to military mass-housing. These facilities will accommodate the workers, mostly men, while the families remain back home.

It is generally understood, however, the actual material character of temporary housing will not be different from the so-called permanent structures. Dwellings remain under the original Lanham Act classification—built for rental at \$50 a month, or built to sell at \$6,000 or less.

### Heating Plans

It is true the houses are to be heated by any type of central system warm air distribution the builder and the contractor agree upon; but there is a well defined impression that coal will be the prevailing fuel, except in the few areas where oil is still available. Gas, of course, is out in all new homes. Gas will be under strict rationing everywhere within a few months.

The FPFA furnace specifications, inherited from FWA, range from 30,000 Btu, through 40,000 to 60,000 Btu. This provides a clear index of the kind of furnaces that will be used in the war area houses. Some larger furnaces will be used in some houses built in war areas, but the number of larger houses will be so few that their place will be almost negligible.

Under the new FPFA dispensation, furnaces and other equipment will patently be procured by subcontracting, in many cases, which will throw much business to local sources; but even this is not altogether certain. FWA initiated mass-purchasing of furnaces and similar items. FPFA apparently is intrigued by the sociological aspects of mass-purchasing and gives indications of utilizing the mass-purchasing facilities. This means that furnaces purchased through the Procurement Division of the Treasury, are stored in the manufacturer's factory and in proper time the necessary number are shipped to the local contractor who is paid for installing them.

### Furnace Limitation Order Coming

L-79, the prospective order which restricts the sale of furnaces and other equipment except in war areas, affects all sales outside war areas, but does not interfere with manufacturing. Its purpose will be to keep furnaces and other equipment away from all building operations except those required for war. The order is regarded as a step toward complete arrest of practically all production of furnaces and it is assumed this stoppage will occur very soon. There is a general impression here that pig iron is rapidly becoming seriously short and that plate is so scarce that much sheet production must rapidly be sacrificed for the production of plate. The shift from relatively free supply to absolute denial is apt to be a jolt to the industries that use the metal.

We hear here that the supply has been so free that inventories could readily be replenished without recourse to priorities. In fact, it is understood that many operators in industries closely allied to the building industries found it more convenient to secure supplies without benefit of priority rating. Priority ratings involved restrictions and commitments that were often troublesome and paralyzing. The greater cost for materials secured without benefit of priorities is said to have been more than offset by the readiness of supply and the freedom of action. Apparently for this reason many manufacturers of equipment required for houses have not sharply felt the restriction in securing materials.

But Amendment 2 to Order M-17 by which WPB took complete control over the allocation of pig iron, foreshadowed other orders which will more tightly grip the distribution of raw or fabricated material. These orders not only permit WPB to trace every pound of metal, but enables WPB to demand justification for the use of every pound.

### Plumbing & Heating Branch in Hot Water

There is much unhappiness in WPB over the situation in the Plumbing and Heating Branch of WPB. This is relatively a large unit, with considerable personnel. Not long ago a disgruntled employee made a complaint about the difficulty in getting clearance to do a task. This caused one thing to lead to another and in the showdown it was discovered that many persons in the branch had faithfully and industriously gone through the motions of working day and night, but little had come of their earnest efforts.

All this broke about the time the Congressmen at the other end of the Capitol were being bombarded by the voters for the confusion and conflict in WPB, and the Congressmen logically turned their spotlights on the Plumbing and Heating Branch. They found the branch had made efforts to issue orders to conserve metals, but that in some mysterious way the orders had almost always become entangled in legalistic underbrush which prevented their final validation. The argument spilled over in the daily newspapers. Congress was again caught in a blizzard of angry letters, and out of all this finally came the orders which are drying up metals and restricting sales.

Already a still more drastic order is in the making. The next order will drastically curtail production of furnaces and other heating equipment. The program quite likely will follow the pattern now familiar in the conversion of the radio and phonograph industry.

(Continued on Page 96)

# Association ACTIVITIES

## National

The National Warm Air Heating & Air Conditioning Association will hold a one-day session at the Stevens Hotel, Chicago, Tuesday, June 8th.

## Pennsylvania

The annual Convention of the Sheet Metal and Roofing Contractors' Association of Pennsylvania will be held July 16 and 17, 1942, at Erie, Pennsylvania, Convention Headquarters—the Lawrence Hotel. M. F. Liebermann, Secretary.

## Florida

April 16, 17 and 18 are the dates of the annual convention of The Roofing & Sheet Metal Contractors Association of Florida, to be held in Miami at the Alcazar. The Miami Committee welcomes all members. Manufacturers' representatives, wholesalers and salesmen are urged to attend as in the past.

William N. Palmer, President,  
15 N. E. 17th Terrace, Miami.

## Chicago—Central Committee

At the March 12 meeting of the Central Committee of the Furnace and Sheet Metal Association of the Metropolitan Area of Chicago—held at Rosie's Restaurant, 3921 Harlem, and preceded by an excellent banquet—John Spitzer was master of ceremonies.

1942 officers installed are:

President—John Spitzer  
Vice President—John Bierma  
Treasurer—John Novak  
Secretary—William Kirby  
Life President—George Fiebrandt

Paul Barth made a nice speech; D. C. Ellison and Ed Nemec were present and helped to make the occasion a very enjoyable one.

John Spitzer, President.

## Dayton

A large meeting of the Dayton Sheet Metal & Furnace Association was held at the Shrine Club, Thursday evening, March 5th, attended by eighty-five business men connected with the heating industry.

After dinner the meeting was opened by George C. Brake, the president of the Association, who spoke on the present day problems of supplies and labor.

Capt. T. O. Brightwell, Executive Officer of Civilian Defense, gave a very interesting description of the various departments and their duties in civil defense work.

Harry G. Binger covered the field of Class Advertising. Attorney Robert Knee spoke brilliantly on America as we know it.

City Building Inspector C. M. Owens described the need for better installation and less fire hazards.

After an interesting run of pictures, Ray Barrett, Chairman, closed the meeting with an appeal for unity, co-operation and "buy victory bonds."

George E. Brake, President.

## Fan Manufacturers Meet and Celebrate

At the Annual Meeting of the National Association of Fan Manufacturers held in Detroit, Michigan, on February 12, 1942, the following officers were elected for the ensuing year: J. M. Birkenstock, President; Edgar F. Wendt, Vice-President; and L. O. Monroe, Secretary-Treasurer. At the same time the Association celebrated its 25th Anniversary, having been organized in 1917.

## Sharp-Rybolt-Wise Testimonial Dinner

Three newly elected officers of the National Warm Air Heating and Air Conditioning Association were guests of honor at a testimonial dinner given by nearly one hundred of their close friends at the Hollenden Hotel, Cleveland, Ohio, the night of March 30. The men so honored were Harold S. Sharp, Vice-President, The Henry Furnace & Foundry Co., Cleveland, Ohio; A. L. Rybolt, General Manager of the Rybolt Heater Co., Ashland, Ohio; and Atlee Wise, Vice-President, The Wise Furnace Co., of Akron, Ohio. Mr. Sharp was elected president of the Association



Atlee Wise—Harold Sharp—A. L. Rybolt

at the Philadelphia convention in January of this year. The other two men were elected directors of the Association at the same meeting.

Originally intended as a gathering of Ohio men in the heating industry, the idea spread until guests included men from many other states. The meeting was presided over by C. H. Foulds, Sales Manager of The Perfection Heater Co., Cleveland, who also acted as chairman of the committee.

Speeches were limited to two minutes and the speakers included Allen Williams, former managing director of the Association; George Boeddener, present managing director of the Association; Webb Rybolt, father of A. L. Rybolt; C. A. Olsen, and W. G. Wise, former presidents of the Association; Walter Seelbach of The Forest City Foundries; C. E. "Jim" Wilcox, of Grant Totten, Inc., Canton, Ohio; Wesley Moore, of The Minneapolis-Honeywell Co.; Brunsen Durant, of Coessons and Fearn, of Philadelphia.

An illuminated scroll signed by every guest present was presented to Mr. Sharp. Other handsome gifts were presented to the three honored guests.

In acknowledging the honor accorded him, Mr. Sharp sounded a serious note in reporting new problems that are confronting the industry, and urged the necessity of every member of the Association to work together to the fullest extent in fulfilling the program of the Association in its cooperation with the government.

The other members of the committee were as follows: Herbert F. Curtis, of the Auer Register Co.; Robert A. Jack, of the American Artisan; Wesley Moore; "Jim" Wilcox, of Grant Totten, Inc., Canton; and "Sherb" Yardley, of the Republic Steel Corporation.

## 1942

## CONVENTIONS

Apr. 17-18—The Roofing and Sheet Metal Contractors Association of Florida. Annual. Miami. L. A. Burgess, Secretary-Treasurer.

July 16-17—Sheet Metal & Roofing Contractors' Assn. of Pennsylvania. Annual. Lawrence Hotel, Erie, Pa. M. F. Lieberman, Secy., Ambridge, Pa.





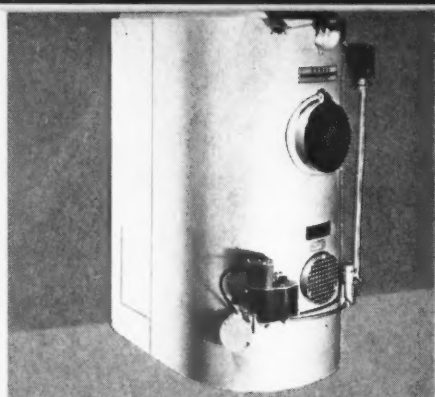
AMERICAN ARTISAN

# RESIDENTIAL AIR CONDITIONING

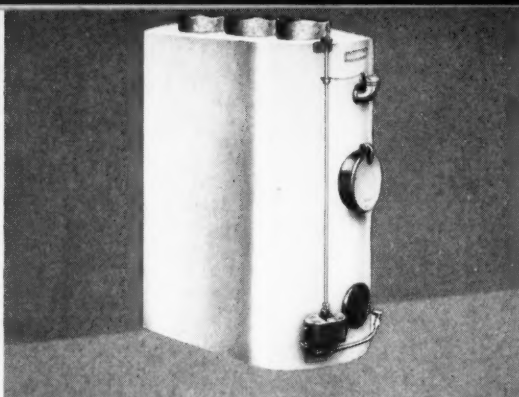
S E C T I O N



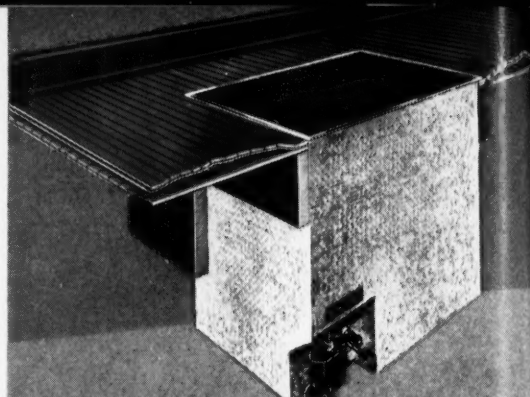
DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING



**MODEL OA-63-NLT FORCED AIR UNIT**  
Compact unit for installation with duct work in basement or utility room.



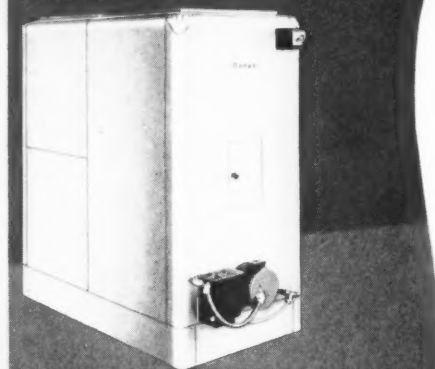
**MODEL OB-60T AUTOMATIC GRAVITY UNIT.** For basement only. Costs no more than a small hand-fired coal furnace.



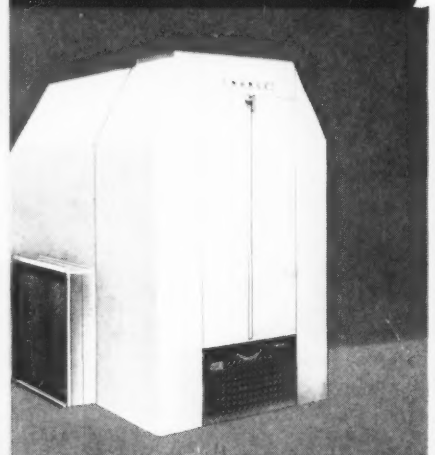
**MODEL OC-60 FLOOR FURNACE.** Modern vaporizing unit extends down only 36 inches, controlled from the room above through floor grill.



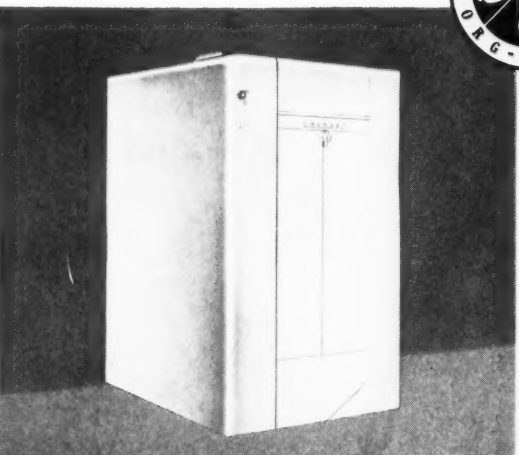
**MODEL OD-70 FURNACE AND BLOWER**  
Occupies 26 in. sq. floor space. For installation in utility room or closet.



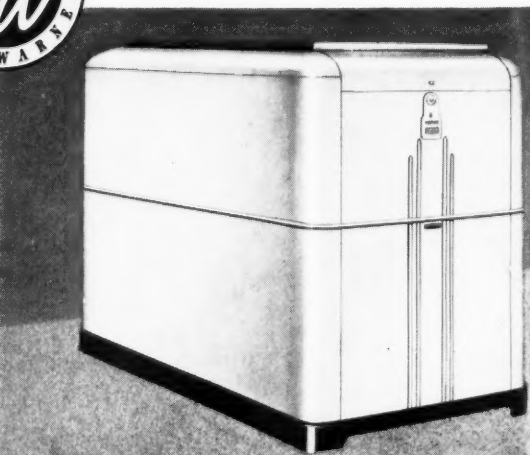
**MODEL OE-80 WINTER AIR CONDITIONER**  
Horizontal pressure vaporizing unit.



**MODEL O-90 WINTER AIR CONDITIONER**  
Automatic pressure atomizing type.



**MODEL 120 WINTER AIR CONDITIONER**  
All controls, mechanical parts concealed under the handsome modern cabinet.



**MODEL BO-9.** Modern, brilliantly engineered, deluxe air conditioner for the larger home.

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You'll have the edge on competition because the Norge line is the most complete and lowest-priced on the market!

Norge foresaw the needs of low-cost housing years ago. Today, it is ready with automatic units to meet any specifications for every type of defense home.

Thousands of satisfactory installations and a steadily increasing demand by builders for Norge, prove that Norge

puts more engineering and more quality into these units. Every unit is modern and streamlined. *Each is factory-assembled and factory-wired for quick, money-saving installation.* Each is backed by the nationally-advertised name and years of experience of **NORGE BORG-WARNER**. Write today for details about available territory franchises.

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SEE **NORGE** BEFORE YOU BUY!



*Low Cost NORGE Oil Units for Every Home*

# The All Fresh Air-Conditioned Hospital

By Everett S. Buck

Fort Wayne Air Conditioning Co., Fort Wayne, Ind.

Hospitals, most people who have been in them in summer agree, are about as noisy, poorly ventilated and air conditioned as any spot imaginable. Why this should be remains a mystery. Why hospitals have so much noise, so many odors, such a stuffy feeling is pretty clearly described in this article. This is a double story—first, a description of an actual installation using all outside air (furnace heated and cooled) and, secondly, a footnote discussion of the theoretical why's and wherefore's. We suggest reading from text to footnote and back to text as noted in the article.

IT may be interesting to many heating contractors to know that a forced warm air heating system in the Murphy Medical Center Hospital, Warsaw, Indiana, conclusively proves it can be more economical to use all fresh air taken directly from outdoors, condition it, use it once, then exhaust it with a separate blower, than it is to use recirculation, or radiators with open windows for ventilation when infiltration does not suffice.

There is just one proviso attached; that you ventilate as much as one volume (total cubic contents) or "air change" per hour. You will need this much and you can probably use a great deal more, for if you do not, your nose will tell you the need every time you enter from outdoors. But there are many buildings—tightly built, storm-sashed homes, compact multiple apartments, party-wall stores, etc., which do not leak nearly "one air change hourly"; indeed, little over a half-volume is needed for small-family, fair sized homes which are recirculated, for the total fresh air per person is ample and needs only to be well and constantly churned and mixed by the blower,

then delivered to the rooms by a supply system good enough to prevent stagnant spots. (Now read Note A below.)

Hospitals, in particular, present a difficult problem. The typical room occupancy consists of one to four necessarily quiet and super-sensitive or helpless patients and a vigorously active nurse. The comfort and ventilation requirements of these patients must be met quickly and constantly. The nurse does the best she can by adjusting windows, shifting the bed screens and coverings, but any one who has ever used thermometers and silk floss indicators or smoke-pans to trace the path of the air leaving or entering open windows will agree that the attempt to use them as ventilators is fraught with trouble.

The air volume varies with every fitful breeze, with every temperature change; the infinite variety of these temperature-volume combinations plus the manner in which the air enters, both work to defeat the nurse's best efforts. A brief consideration of what happens shows the futility of the scheme if the building is more than one

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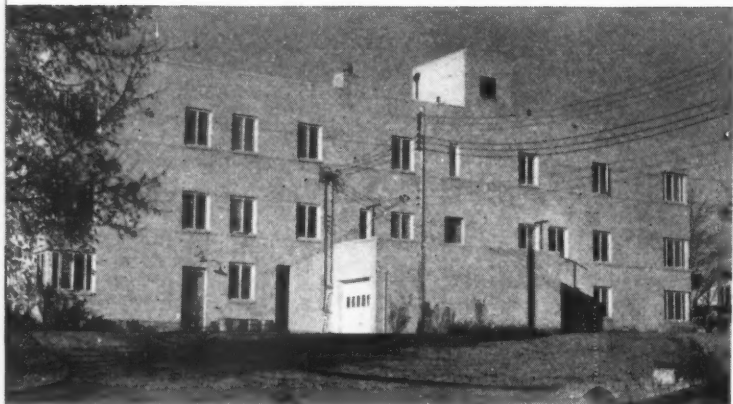
*Note A*—This is difficult, costly and almost impossible to do without creating annoying drafts if your city code prevents you from getting any value from the one principal reason for using a blower; i.e., smaller ducts, and the smaller registers that are imperative for proper throws from high wall locations.

Certainly, if you use a fan that is noisy when run at a pressure to exceed 500 fpm velocity and your control system lets it run only half the time, your duct must be just 4 times as large as that of a 1000 fpm velocity constant blower system carrying the same total heat and air.

Worse, you cannot get the throws now demanded

by all the register manufacturers, and stopping your fan is fatal to comfort.

Also, small inleakages do not satisfy the ventilation needs of a hospital, and in actual operation they do not satisfy the occupant of the steam heated apartment. He opens the windows, usually as wide as the capacity of the heating system will allow, and the result is a tremendous waste of heat, the cold entering air dropping uncomfortably into the lower levels. This air is not only extremely dirty, but much too dry to be brought up to normal by such humidification sources as plants, people, running water, cooking, etc. (Now go back to main text.)



Exterior of the Murphy hospital. C. L. Griffith, Architect.

room wide. Air enters the windward, leaves the leeward side, of a building. All of the ventilating fresh air for any two facing rooms must enter the windward room and be heated, then pass across the corridor to the leeward room, carrying the odors, the excess heat, dust and bacteria we are trying to remove.

It is not hard to believe the findings of the most recent research workers' reports from two University Schools of Public Health, which indicate that air-borne bacteria can make this short journey aboard their invisible dust particle parachutes; certainly odors make it and the prevalence of post-operative pneumonia indicates that pneumococci also make this little journey.

We have eliminated this at Murphy Medical Center Hospital by keeping a plus-atmospheric pressure on the room, a slight minus pressure in the corridors, exhausting these through ceiling grilles by independent, constantly operating exhaust blowers which discharge above the roof. Air from one room simply cannot cross this corridor low pressure area and enter another room

*Note B*—To make the problem more complex, in a window-ventilated room, cross ventilation is imperative. With all of the ventilating air entering East rooms one day, West rooms next day, the piping and radiators or the ducts and registers must be oversized on both sides and zone temperature controls must be carefully planned. The added cost of oversizing may not, of itself, bar the open window scheme. It is the sheer wastefulness of the poor circulation that condemns it, for several times the room volume can slide in over the sills every hour, move across the floor and out of the opposite room windows, but the room it enters may still have a bad odor, still be badly ventilated for the person breathing air from the four or five foot level, while the floors and ankle levels are cold.

Everyone knows the difficulty of getting cold and warm air mixed (to comfort temperature) before it can strike some one in sufficient volume and velocity to constitute a bad draft. The obviously correct solution is to constantly use just as much air as is needed

which has a plus pressure. (Now read Note B, below.)

We used high wall distribution for Murphy Medical Center Hospital, and the only unusual thing about it is that the air is used just once, in such a manner that it first does its work of offset-setting wall and glass heat losses, then, fit to breathe, flows slowly across the human occupants toward the exhaust grilles in the corridor ceilings. (Now read Note C, page 43.)

#### High Velocity Gives Thorough Mixing

In the Murphy Hospital we get comfort by reducing the air volume, increasing register velocity and temperature, improving the scheme of mixing. You need good equipment that has high velocity and turbulence over ample heating surface to do this efficiently, which is especially true on such as the Murphy Medical Center job, where it is necessary to raise the air from an incoming 10 below to an outgoing 200 or whatever temperature is needed to carry the total heat, not only of all the air used, from its entering temperature to the room comfort temperature, but also the heat from room temperature to the point above this which will offset all the heat lost.

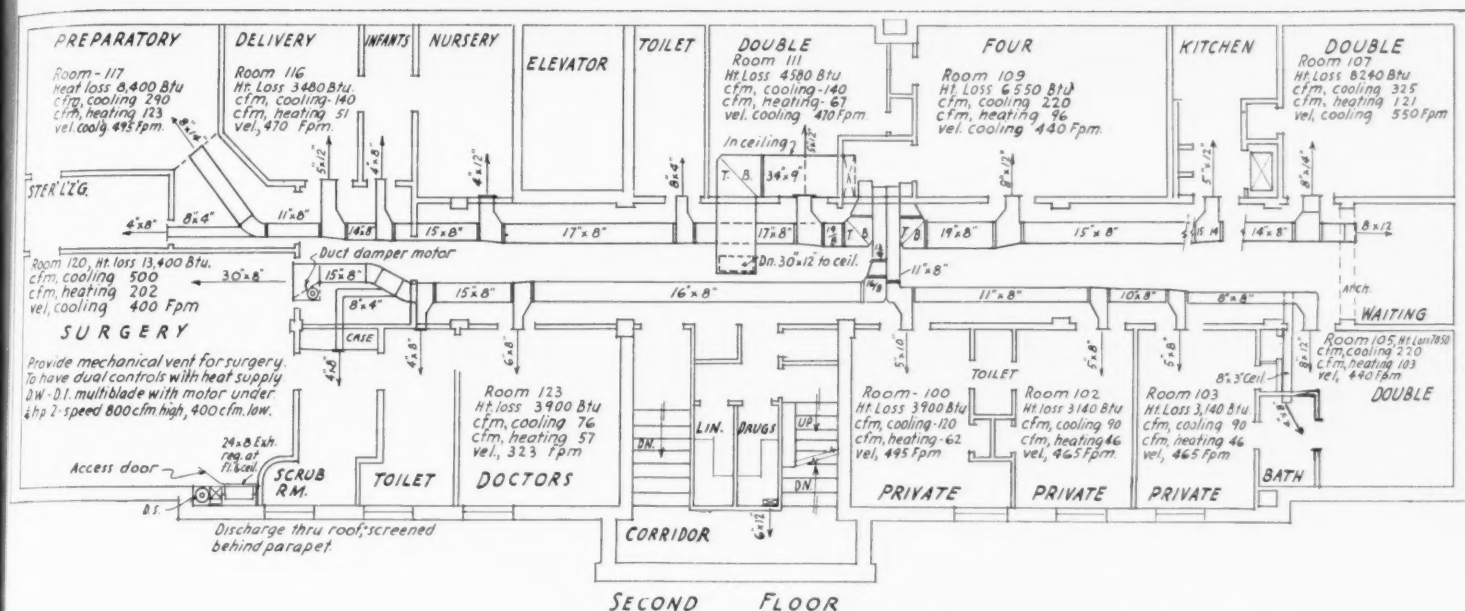
This requirement put gas as fuel out of the question, for the A.G.A. laboratory rates equipment on a basis of pouring so much air through the heater that the temperature rise is limited to 100 degrees, hence, no equipment is available for really hard duty.

The oil industry still has no such rating method, so we were able to get equipment built good enough to "take it" when fired with oil. On this job we are getting 90 per cent efficiency from this oil-fired equipment.

By combining this with a sensitive 3-stage temperature control which gives three burner rates under the influence of the air leaving a group of occupied rooms, we got such perfect comfort results that only one correction was

for ventilation, no more, and to effect as complete and thorough a mixture as possible of outside and room air, without disturbing the air in the lower levels.

Then let the mixture lose its heat-above-comfort by contact with the outer wall, (or its cold-below-comfort in cooling) then move through the occupied zone and accomplish the work required of ventilating air; i.e., removal of excess body heat and moisture of both the breath and perspiration, while supplying fresh air to breathe. Our problem is complicated by the need of heat-above-comfort to supply heat lost by outer walls. If the greater part of this heat can be supplied by warm walls, ceiling or floor, the remainder by a gently rising sheet of air all along one cold wall, with the room pressure relieved at the opposite wall, we should not need much air for good ventilation, as the air, once used, could pass out through the door to waste. But the cost of doing this in a manner that will satisfy building codes, may prove excessive. The next best thing will be adequate distribution from high inside wall registers. (Return to main text.)



This second floor layout of the conditioning system is typical enough to serve for all floors. Legends in rooms give the pertinent data on the heating and cooling cycle.

found necessary. In mild weather, with the burner floating between a strong pilot rate and the medium, or "coasting" rate (a scheme which answers perfectly well when recirculating the air at 65 degrees from a home), we found that the much lower entering air temperature cooled the room more rapidly than the thermostat control, coupled with an essential requirement of lag in coming up from pilot to "coaster" fire, could handle.

The condition was similar to, though not so pronounced as the well known "Cold 70" of con-

ventional "on and off" burner and blower heating. A simple duct stat corrected it, but the insertion of this 4th point in the burner control necessitated almost complete re-wiring of the control circuit, to keep the blower and burner stages synchronized. (Now read Note D, page 44.)

Our overall heat transfer efficiency at Murphy Medical Center Hospital is above 90 per cent. Heating equipment consists of four direct-fired heat exchangers, one for each of the four directional zones of the building. The four step control of three stages of combustion, synchronized

**Note C**—The ideal condition for heating, from both the health and economy standpoints, is the lowest ambient temperature that will provide comfort. There is no merit in the proposition of recirculating large volumes of air, except for the purpose of obtaining more total heat transfer from an undersized furnace or a low temperature coil. In fact, if it were not for the human ventilating need, you would be much better off if you could make the room air stand still, for the moment it begins to move, it starts removing heat from the human body, and the faster it moves the higher its temperature must be, for comfort.

Failure to realize the complex nature of the problem of creating a human comfort environment is responsible for this most frequently made error, (no doubt because of confusion with human cooling, where it is of value in maintaining comfort when we are, economically, trying to carry as high an ambient temperature as possible) of increasing the volume and lowering the temperature of the entering air.

Now the human body is very sensitive to a slight increase in air movement which occurs: 1—when the ambient temperature is near the low point in the comfort range band; 2—when the air moisture is relatively low; 3—when the body subtending surfaces—floor, ceiling and walls—are much below body surface temperature.

It will be worthy of note that condition 1 is an imperative for economy, because fuel use is directly proportional to indoor and outdoor temperature dif-

ference, but conditions 2 and 3 are rather flatly limited by the kind of structures we build. There is not much one can do about the fact that 98% of our buildings impose a maximum limit of about 25% relative humidity; that they present very cold surfaces when the weather is below freezing. But the very instant you increase air volume, you must raise its temperature, because you are increasing air motion in the room, regardless of how cleverly you do it.

Volume and velocity should not be confused, but it is seemingly impossible for many to understand that insofar as air introduction is concerned, a reference to velocity without a statement of the accompanying volume is utterly meaningless.

It might surprise readers to know there are satisfactory jobs delivering 5,000 cfm per register without draft either when heating or cooling, and other jobs where the register velocity is just under 2,000 fpm (not cfm). There are, by contrast, hundreds of drafty jobs which only dump a hundred or so cfm per register and at low velocity. We all know installations where the owner has to keep his room thermostat at 78 to 80, which when properly corrected, are perfectly comfortable with a constant setting of 72 to 73. As the fuel use is in ratio with our 7 month winter average of 35F and the temperature difference, we then burn, say, (78-35):(73-35) or about 88% of the former fuel consumption solely on account of better distribution. (Return to text.)

with two blower speeds, meets every weather variation. Air for the combustion blowers and for the big flue draft-controller comes from the corridor, having already been used once for ventilating the first floor. All of the air used for the heating and ventilating function comes directly from outdoors through a double thick set of filters, is tempered first by the waste heat of the tight breeching and the heater jackets, then by the tempering sections of the heaters, thence through another set of air filters to the direct passes of the heaters, where the humidifiers, fed through an insulated water line to visible drips, complete the conditioning process. The insulated water line is necessary because the temperature of the heater room is frequently far below freezing.

Thus we have recovered 90 per cent of the heat in the fuel, compared with the 70 per cent which is considered very good with steam boilers, but the economy does not stop here. By positively controlling at the proper ventilating rate, we prevent the waste of badly mixed and excessive air introduction that is inescapable with manually controlled windows, which is almost invariably accompanied by rooms that are overheated in an effort to compensate the cold floor condition

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*Note D*—Let us stress this point again; good distribution and circulation do not depend upon large air volumes. Good *mixing* of the incoming and room air, then steady, controlled flow of the mixture over the human occupant at comfort temperature is the ideal. To get it without wasteful volume, requires high velocity and turbulence over ample heating surface. A great deal of the air passed through many furnaces never touches, or just briefly glances off, the heating surface and the temperature of the air leaving is a complex of mixtures ranging from 80 to 350 degrees.

You build a plenum or a tapered duct and elbow section for the sole purpose of mixing these various tempered airs in the plenum to a resultant 135 degrees. Your problem is to get that plenum air mixed with the air that is being cooled by the cold wall and glass, before it can strike any of the human occupants.

Now instead of mixing at the plenum, suppose you take one volume of high temperature air and make it mix with those other volumes of air without removing them from the room. Put the air in high overhead in a wide thin stream and you will have your mixture before the air has traveled four feet. If you do not let it stop, you can keep all the upper level air moving over to the cold wall where the heat is being lost and if you will exhaust under the doors of the same wall from which the air entered, you will finally get the room warm with air that is not being disturbed at the lower levels, but is definitely being moved out of the room at a rate of motion classed as "still air."

Again, what do you care how high the ceiling temperature may be? If it is the upper floor, effective ceiling insulation is cheap. If there is a floor above it, you will help the room above. The higher the ceiling temperature, the warmer the floor of that same room, without ever affecting the air between, for that is the effect of radiant heat transfer.

You cannot use low entering velocity with a high

caused by low velocity entrance of such heavy, cold air. The actual fuel use during the measurable portion of last winter was compared with that of direct fired steam jobs which had adequate radiation to compensate an infiltration equal to 2 air volumes per hour, and was found to be not only less than that of ordinary direct steam jobs, but also, less than that of the best reported from a group of more than a hundred operated by one skilled management company, some of which had been recently modernized by new traps and outside-inside temperature control systems.

The result could not have been otherwise, even if the ventilation of the steam heated building had been wholly ignored, for it is almost impossible to prevent an average infiltration in the amount of one volume per hour during the heating season. Very little more than one air change is needed to maintain fine air conditions and a steady constant flow of fresh air sufficient to provide a sustained plus-pressure on every room of the hospital, exhausting air from the corridors only after it has well performed its ventilating function, which follows after it has tempered the cold walls and glass, the latter being double and tightly gasketed. In other words, no more heat is needed for the controlled fresh air system,

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register or your warm air will not get over to the cold wall. Your windows cannot be either very leaky, or very large, or the concentrated cold down-flow will make a cold spot that will start a draft. Keep a pressure on the room. Do not lose it with an exhaust grille in the room, but force the air out at the lowest level, which is under the door. The ankle levels will be one or two degrees higher if the door is kept closed. You cannot do this with large volumes of entering air, but small volumes of fresh air are entirely adequate for the ventilating need. Class rooms, crowded rooms will require special treatment, but rooms for ordinary occupancy will be found to work out very uniformly, as those for multiple occupancy have proportionally greater wall area, thus the human air need is automatically met by meeting the demand of greater heat loss.

In designing such a system you will completely disregard the relation between room volume and entering air volume. You will design primarily for the proper fresh air quantity for the room having the highest ratio of human occupants to heat loss. Then you will meet this hourly heat loss with the simple equation

$$HL=60 \text{ cfm (T. ent.-T. lvg.) } 0.0182$$

Solving for the T. ent.; the T. lvg. of course, being the comfort point of the structure.

If you cannot get your entering air hot enough to satisfy this condition, efficiently, with the equipment you are using, either build your own economizer, or select equipment that has enough heating surface. There is no excuse, other than low price, for equipment with so little or so poorly designed heating surface that it requires wastefully huge air quantities to efficiently transfer the heat from combustion gases that leave blue flame gas burners at 1800 F and white-orange flame oil burners above 2200 F. (Now return to main text.)

sometimes even less, while the efficiency of heat recovery from the fuel is around 90 per cent by comparison with 70 per cent (or at best—less than 80 per cent with the best steam boiler).

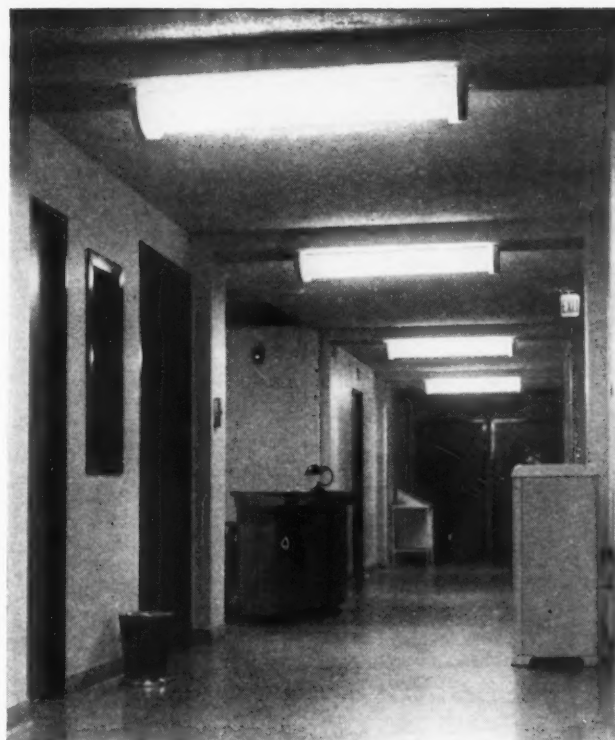
We not only start our job of utilization with more of the heat, but we introduce that heat in such a manner as to avoid air motion in the lower room levels, which lets us carry a lower temperature to provide comfort. We have been able to find but two better ways to introduce warm or hot air. (Now read Note E, below.)

#### Registers Located for Cooling

The high-wall, high-velocity supply used at Murphy Medical Center is not perfect for winter heating. To be perfect, it should be aided in severe weather by a ceiling maintained at 110 to 130 degrees or a floor held at 75 to 90 degrees. But by careful design, aided by constant blower operation, no air motion can be felt in the occupied zone, and the comfort point of 71 at the floor, 74 at the head level, for the bare plastered brick walls of the rooms, is about as low as can be secured with a simple air system, unaided by any form of low temperature radiant heat.

This temperature does not vary more than a degree during any hour, as the zone thermostats are placed in the path of the air leaving the rooms under the doors. This location, providing rapid motion of the lowest temperature air of the room, plus a slight amount of heat acceleration in the instrument, when tied in with three burner rates, actually makes most of the temperature cycles without the slightest change being visible in the thermometers hung at eye level on the walls.

We did not want to lose the valuable feature of sustained, plus-atmospheric pressure maintained by constant delivery of all-fresh, triple filtered, conditioned air in the surgery, yet we knew we must remove more than normal amounts of air when the anesthetists and surgeons started



Corridor view showing (behind the desk) exhaust grilles at the floor and at the ceiling. Air entering the high grille on the floor below this goes to the combustion blowers on the oil burners.

to open gas valves and abdomens. The technique in some surgeries has been a futile attempt to keep all air away from the operating field by setting up glass screens, but the combination of heat and odor quickly becomes so nearly unbearable that nurses and surgeons alike have expressed wonderment not only that the patient survived, but that they too came out alive. We had sufficient faith in our original air source and the value of our triple filters and other various impingement surfaces to believe there would be few, if any, air-borne bacteria.

So, coincidentally with starting a small exhaust

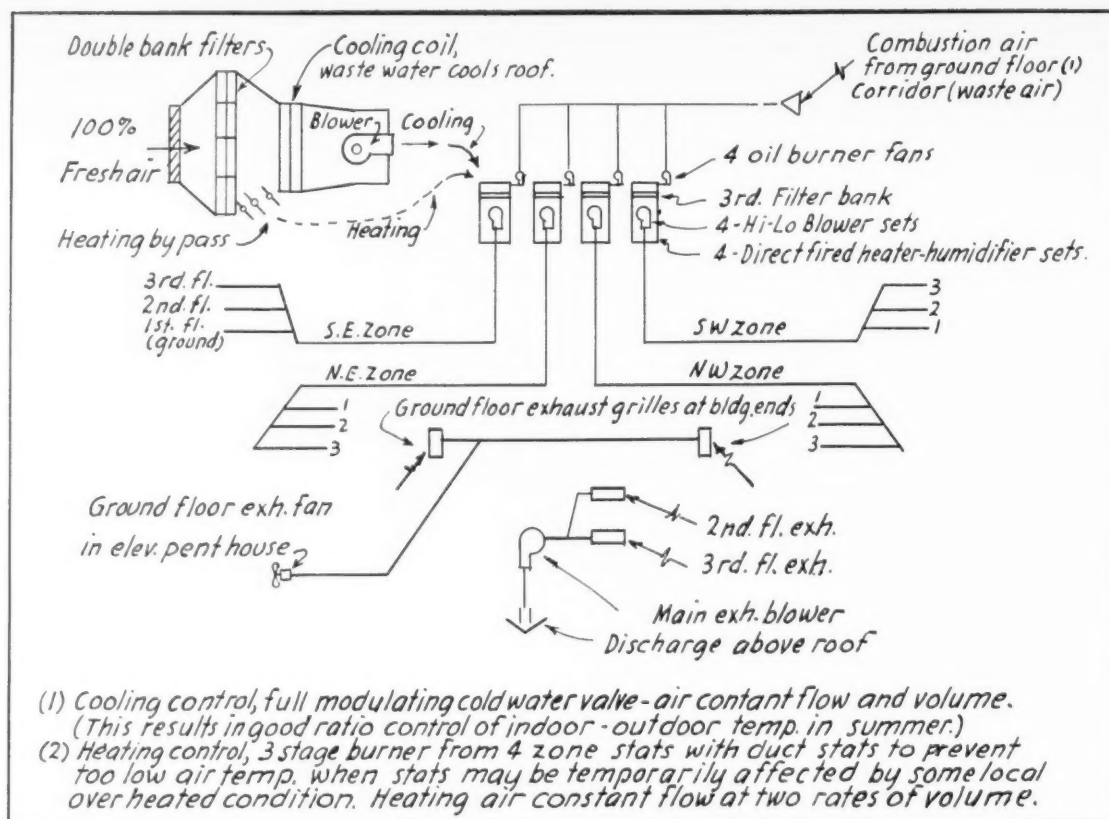
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*Note E*—Method No. 1 is to cause the air to first give up some of its heat to the floor as it passes completely under the floor before rising into the room in a flat sheet extending almost completely across one outer wall. (See Buck Warm Floor Panel Heating, January, 1942, American Artisan.) This permits an even lower comfort temperature, provides low temperature panel heating (or cooling). There has been argument against warm floor panels on the ground that it is a fire hazard in a wood frame building. Actually, it is hard to conceive a safer system, as the air is orificed into such tiny quantities at such low velocity into such a hard to ignite surrounding, that it removes most of the only hazard that could be attached to the supply duct system of a direct-fired job; i.e., the close-up, favored, large duct branch.

Once you have shielded the area immediately above and adjacent to a direct fired heater and provided a non-closeable air inlet and outlet of bare galvanized duct, you can shut off the blower and fire the unit at double firing rate without fire hazard—any danger-

ously excessive heat will be dissipated by radiation if your heater is in a room of decent size. It would be the walls and ceiling immediately adjacent to the heater that would burst into flame, not something out alongside the duct. You must have a considerable weight of combustible subjected to a temperature of above 1200 degrees to start a fire in a wood frame, and if air can flow freely enough to prevent the condition of self-generating heat (spontaneous combustion) it is very difficult to attain such a temperature in the furnace jacket itself, let alone in the bare duct some distance away.

Method No. 2 is the vertical slot supply which extends almost the full length of one outer wall, with air removal at the opposite wall. This is excellent for crowded class rooms, dance floors and small restaurants, and we have used a modification of it in churches, jetting the air up and angularly away from tall windows on each side of the room, removing it at the bases directly underneath. The exhaust duct is preferably tile, laid to drain so it can be flushed out with a hose stream. (Now return to main text.)



Schematic flow diagram of air for heating or cooling; also ventilation flow; also combustion flow.  
Four zones, four furnaces provide flexibility of control.

blower which removes air both at the ceiling and the floor adjacent to the operating table, a damper motor opens to admit a quantity of fresh supply air equal to that which is exhausted. One might expect overheating during cold weather, but the surgery is carried at about 2 degrees below normal "at rest, seated" comfort point, and the lag incident to heating up the tremendous weight of brick, marble, terrazzo, plaster and steel materials of the room, seems to be adequate to prevent overheating during such short periods required for exhausting during and after an operation.

All our fresh air is taken in low, on the sun side of the building. The surgery exhaust and the blowers which maintain a minus-atmospheric pressure in the three long corridors, all discharge through the roof, three stories above and 50 feet distant from the fresh air inlet. Being warm, this exhausted air could not possibly drop down to the inlet.

#### Ducts Sized for Cooling Delivery

You cannot select the perfect temperature for cooling quite as you may for heating, where your heat exchange temperature difference between the hot gases and entering air is around 2,000 degrees. Rather, you try for air at a low enough dewpoint that it will not be more than 50 per cent R. H. after it warms up to the inside comfort peak of around 80 F., using the most economical cooling medium. Using this lowest economic air temperature, you again satisfy that same simple equation.

Heat gain from all sources = 60 cfm (T lvg. — T. ent) 0.0182, but this time, you solve for cfm instead of T. ent. as in heating.

We had ample cold well water (54 degrees) to

give us perfect 59 degree dewpoint air at peak design condition when passed through a big counterflow coil at low velocity, but the headache of design arose out of the fact that inner North rooms required just the Winter ventilating quantity, while some South West, sun-exposed, large windowed rooms, needed eight times the Winter cfm.

It was solved by designing the duct for the Summer air delivery, and devising an air delivery fixture that could be manually unblocked to provide the greater volume at reduced velocity to compensate the longer throw potential of such a greatly increased air column. Some of the two North units' air capacity was trunk-switched into the two South duct systems, additional air needed was provided by a 1½ hp fan set, arranged to draw through the cooling coil and discharge into the inlets of the four heating fans. (Be sure you have the right type blowers if you try this.)

It would be nice to report perfect zoning of the cooling system, but the cost of doing it could not be borne in the face of the practical fact that there is a very wide range of human comfort tolerance in Summer cooling, which is totally absent in Winter heating, where you must increase the room air temperature as the temperature drops outside, to compensate increased body radiant heat loss to the colder walls. You do just the opposite of this in Summer, allowing the temperature to rise despite the fact the walls are getting warmer, but you do it to prevent human shock when entering or leaving the cooled room.

The economy of this Murphy Hospital cooling system lies not only in the low cost of pumping the cold water—we are getting almost 40 tons of refrigerating effect with a little over 5 kw

on the pump instead of using 40 kw on a compressor—nor in the vastly lower interest, maintenance and depreciation costs, but also in the fact that we can run without pumping during the Spring, Fall and much of the Summer.

Small internal heat loads are removed by operating the heating units' blowers, then we cut in a greater air quantity with the 1½ hp fan set, and when the heat finally does begin to penetrate the structure, a modulating thermostat-controlled water valve begins to let water into the coil. By varying the differential action of this controller, we have its effect exercised from 10 per cent of flow when the rooms' exhaust air is going out at 75, which it does on a sunny day of around that average temperature, to 100 per cent of flow when the outdoor is around 100, at which time, the rooms will rise to about 82 if the hot spell has been of long duration.

Waste water from the coil is a little more than adequate to offset the entire 3rd floor ceiling and roof heat gain when it is all used to flood the roof, and the great effect of this was rather forcibly shown by a chance incident, during a heat wave. Plumbers, cutting in a line for other water duty, had given us temporary connection through a fire hose and we cut out our modulating control to prevent a break, as the pump is designed for both greater head and volume than we are now using. The day was scorching hot, almost 100 F., but about midnight, with no roof sun, the night supervisor had to rout out extra blankets for all the third floor patients until she could locate the building caretaker to get the water shut off.

For many weeks, there had been an average of about 3 visitors from various commercial institutions connected in one way or another with the air conditioning business, and every one of these visitors warned the hospital staff that really good cooling could not be done with cold water. But this happy accident left no doubt in their minds as to capacity and the staff have been surprised and pleased that such tremendous cooling power can be so controlled that conditions inside are pleasant, regardless of conditions outdoors.

The steady stream of water that pours in varying volume from the coil drain pan tells its own story of crisp, dehumidified air on its way to relieve patients, nurses and doctors alike, in sticky-hot summer days and, recently, having seen the relief afforded just one man who had been badly burned in an industrial explosion, we were moved to wonder whether or not he could have recovered in the stifling wards of the typical direct-heated, un-ventilated hospital.

Every doctor knows these border-line cases where, after everything humanly possible has been done, life or death hinges on keeping the patient comfortable and it would seem reasonable that a hospital, first of all among buildings supposed to be fit for human occupancy, should be equipped with year round, fresh air conditioning.



The air supply and exhaust in the surgery is explained fully in the text. Fresh air is supplied; air is vented; temperature is held constant by the three-stage, constant flow system.

### Hospitals Should Be Air Conditioned

Hospital architectural ingenuity can surely provide the small heater equipment rooms, located to reduce installation and zoning costs, regardless of the size of the project. In most of the Northern half of the U. S., where cold water pumping cost is one-fifth that of mechanical cooling and depreciation and maintenance costs still less, such systems are well within the budget of any new hospital plan. For Southern locations, use of the reverse cycle for heating should place mechanical refrigeration in the same imperative class. Even in locations where nothing is favorable to low first or operating costs, some study should be given to the possibility that the structure might be reduced in size to provide funds for proper air conditioning, on the basis that just as many patients could be accommodated, because they would recover sooner.

Reports from the Beacon Hill air conditioned hospital, from Cincinnati General and other hospitals where only a few wards are conditioned, indicate many types of cases where the old normal recovery period was reduced 50 per cent and at least some improvement made in nearly all. And Dr. Murphy's comment, that "... it would be hard to express the value of human life in dollars and cents," is most pertinent, when it is applied to those border-line cases of life and death.

Our greatest satisfaction in this job has been in the repeated reports from patients, nurses and visitors of the total absence of typical hospital odor. The record of operations without post-operative pneumonia has not had enough comparative study to substantiate any claim in that connection, but we can at least say we have eliminated most of the suspected conditions under which this deadly killer has flourished; i.e., the atrocious ventilation of most surgeries and the across-the-corridor ward-to-ward circulation of air-borne bacteria, with the inevitable accompaniment of uneven heating and drafts from open windows.

# An Emergency Installation Code

## [Part 1—Why Such a Code is Needed]

By S. Konzo

Special Research Associate Professor  
Engineering Experiment Station, University of Illinois

Houses are getting smaller; furnaces are flirting with 500-pounds weight; installed prices are teetering on the \$125 bid; sheet metal has hit the 60-pound per house mark—but we insist on doing \$25,000 house engineering. It can't be done. What we need to get adequate installation under the present dangerous conditions is an Emergency Code; a Code of Absolute Minimums, if you will, to protect the buyer and our own industry. Without official sanction of any sort, American Artisan here begins publication of such a code. The author is known to every reader. Since this code will likely smash many precedents and break new ground, we invite continual comment.

IN early February a limitation was placed on the use of gas furnaces in certain localities. This order from the War Production Board was followed by the Defense Housing Critical List (March issue) and by restrictions on the use of fuel oil in certain areas. Orders, restrictions, regulations, and new specifications come out at a rate which bewilders the industry.

As a result of all these restrictions, the heating contractor now finds himself forced to abandon former methods and to use new. In this series of articles, the attempt will be to place the present picture of the heating industry before the scrutiny of the heating contractors, dealers, and installers.

Twelve months ago some of our present-day practices would have been condemned as distinctly detrimental to the best interests of our industry, which for years has constantly fought for better standards of heating. Today, due to the serious attempts to conserve metals, the entire industry has had to "realign their sights" and has accepted the challenge to make the least amount of metal do the "mostest". Today's standards may not be applicable tomorrow.

The writer's experience may be cited as an example of how our entire viewpoint has had to be changed in a year's time. Last summer, at the invitation of the Federal Works Agency, the writer made an inspection of several defense housing projects in several states. As far as the entire housing project was concerned, the houses generally appeared to be a "lot of house for the money". However, certain features of the heating systems were considered as not meeting the standards set up in the "Yardstick". These features were enumerated in the report submitted to the housing agencies, and formed the basis of

later friendly discussions with the officials.

Judged by present-day requirements, many of the items, which were objected to last summer as substandard, are now better than present and future practice.

To many of the conscientious, quality-minded dealers in the industry, this change in viewpoint from good quality work to work that barely passes the minimum standards will be difficult to accept. The best recourse is to keep clearly in mind a few fundamental objectives to guide us in our work.

### Basic Requirements of Heating Systems in Defense Housing

The following comments are the writer's personal opinion of present day basic requirements and are not to be considered as representing any official viewpoint.

1)—*An emergency code of furnace construction and installation is necessary.*

In the past our emphasis has been on "how thick should the metal gage be to meet the requirements of good practice?" Today, the emphasis is on "how thin can you make it and still do a passable job?"

The fact that emergency conditions definitely lower the standards should not be accepted as a license to disregard all common sense rules of good practice. There still exists a code of reasonable practice, a practice without frills and without the factors of safety that we have employed in the past. The more we strip our practice down to the working fundamentals the more care must be used to design and install the plants.

2)—*If and when the time comes when the emergency code can be discarded, it should be scrapped.* Perhaps out of our present emergency

practice a few constructive items will emerge as ideas worth retaining.

Many city ordinances contain provisions which will have to be shelved during the emergency. For example, the use of untreated sheet metal for exposed warm air pipes and the elimination of double pipe stacks and fittings are *demand*ed in the defense housing critical list of February 24th, 1942. These items should be brought to the attention of local inspectors as emergency limitations demanded by the War Production Board.

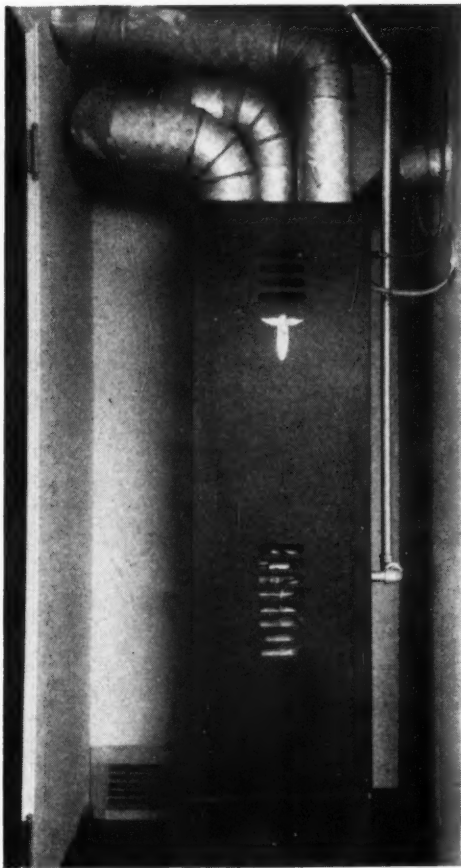
3)—*Heated air should be definitely introduced into each room to be heated.* The "arrow" method of heating, which assumes that the heat introduced into one room will follow "trained arrows" and effectively heat all adjoining rooms, is wishful thinking and is in violation of natural processes.

#### We Must Protect Health

Emergency or no emergency, health requirements demand:

- a) air temperatures between 68 and 75 deg. F.,
- b) uniformity in temperatures of different rooms, not 85 deg. in one room and 70 deg. in another,
- c) and warm floors.

We do not want "hot heads" with "cold feet." In temperature zones (zero deg. F. and colder)



Furnaces are getting smaller—because the space allotted them now fits like a corset.

the most effective method of heating is the central system. The gravity warm-air and forced warm air systems are particularly well adapted to present day requirements.

4)—*The space requirements for heating plants should be kept to a minimum.* The living rooms, for example, in many defense houses are no larger than 160 sq. ft. in floor area. The use of floor registers and floor grilles will not provide as much living space as the use of baseboard, low sidewall, or high sidewall registers.

The 26 in. x 26 in. forced-air furnaces were developed as a result of demands by the Federal Works Agency to reduce the floor space of the furnace. This has resulted in the use of high-boy oil and gas-fired units, and in the use of high-open-dome, type coal fired furnaces.

5)—*Hot metal surfaces should not be exposed to the occupants.* Any metal surface temperature in excess of about 200 deg. F. may cause burns to the occupant who comes in contact with such surfaces. The use of any heating plant that exposes such hot surfaces will necessitate a "safety zone" around the surface, and hence will seriously restrict the usable living space. Air temperatures at any warm air outlet less than 175 deg. F. will definitely insure that even if inflammable material is placed over the opening, there will be no danger of fires. In this connection, the design of gravity warm air systems has been based on a register air temperature of 175 deg. F. Forced warm-air systems are usually designed for register air temperatures between 135 to 140 deg. F. The use of these fairly low air temperatures also avoids the possibility of hot ceilings and cold floors.

6)—*The heating plants should be installed with every attention given to the matter of safety from fires.* A newspaper carelessly thrown over a floor grille, whether that grille is part of a floor furnace, pipeless furnace, or gravity warm air system, should not be a potential source of fire. Any design which ignores the possibilities of fires arising from inflammable material covering hot surfaces in excess of 200 deg. F. is defeating the primary purpose of defense housing.

#### We Must Protect Against Fires

A study of normal fire losses in dwellings indicates that fires arising from poor heating plants and poor chimneys constitute too big a share of the total losses. Fires are a luxury we cannot afford today. Any movement towards the increase of fire hazards should be strenuously opposed.

For this reason flue gas temperatures should be definitely limited to a top value of approximately 1000 deg. F. Gas-fired and oil-fired equipment that are properly designed and thermostatically controlled will meet these limitations.

Coal-fired furnaces of the simple open-dome type without radiators have such small draft losses through the furnace that excessive combus-

tion rates are obtainable with even a low chimney. The use of thermostatic control equipment will serve to prevent excessive combustion rates. However, the most positive automatic check on high combustion rates is the use of balanced check dampers in the smokepipe, so set to prevent excessive drafts and hence to prevent excessive combustion rates.

It has been observed in some defense housing projects that the operation of the fan can be manually controlled from a convenient switch. Installers should avoid such wiring installations and strenuously protest specifications calling for such manual switches. If the occupant should turn off the fan at a time when the heat liberation of the fuel is at a maximum, the furnace will not have sufficient circulating air and the equipment will be subject to damage.

Obviously, the smokepipe construction and the chimney should be in accordance with the best practice. There should be no compromise in details which directly affect the safety of the occupant and of the house.

7)—*The heating plants should have a reasonably high efficiency.*

The government officials responsible for the Defense Housing Critical List of February 24th, 1942, have recognized the value of efficient utilization of fuel, and have maintained the efficiency values that have been in existence up to this time.

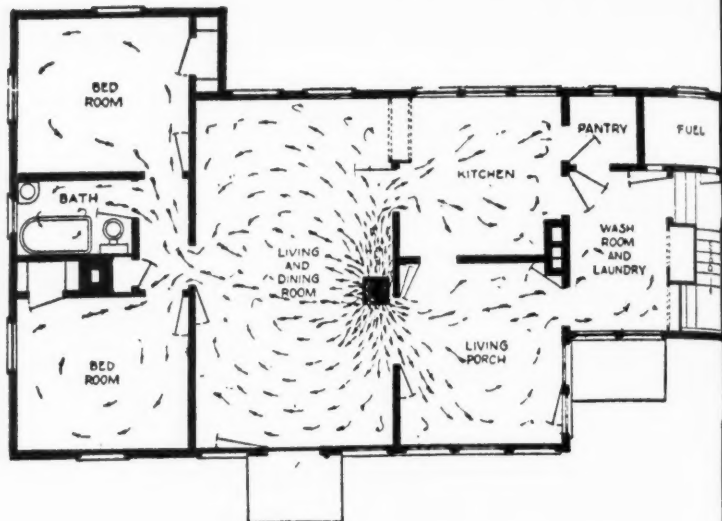
The bonnet efficiencies of warm air furnace equipment must not be less than the following values:

- a) Gas—current American Gas Association limitations of 75%
- b) Oil—70%,
- c) Coal—
  - 1) Hand fired-gravity—55%
  - 2) Stoker fired-gravity—55%
  - 3) Hand fired-forced air—65%
  - 4) Stoker fired—conversion forced air—65%
  - 5) Stoker fired—designed forced air—70%

The ratings for coal-fired gravity and forced-air furnaces are based on the Standard Gravity Code and the Technical Code of the National Warm Air Heating and Air Conditioning Association. Both codes specify that the ratio of heating surface to grate area shall not be less than 15 to 1. The demand of reasonably high efficiency coupled with severe space and metal limitations has imposed an extraordinary load on the design engineers of the furnace companies. The furnaces offered to the trade in the past year are to a large extent new products that have shattered old precedents. If experience proves that the equipment will perform reasonably satisfactorily, it will not be unreasonable to expect that current designs will prevail for several years to come.

8)—*Heating Plants must use a minimum of metal.*

The Defense Housing Critical List of February



It's all very well to THINK about one spot heating—but we proved the fallacy of the "trained arrow" method of heating many, many years ago. This drawing appeared in American in 1906.

24th, 1942, has but one fundamental objective, namely to cut metal requirements to the very minimum. A careful study of the list is a "must" item for every man in the industry. Briefly, here are some of the important items in the list:

- a) All exposed sheet metal ducts and fittings are to be made of untreated or phosphate treated ferrous metal. (Section 5321)
- b) Double wall stacks and fittings are not eligible (Section 5322)
- c) Sheet metal ducts heavier than 26 gauge are not eligible (Section 5322)
- d) Sheet metal return ducts beyond six feet from the heater are not eligible (Section 5322)
- e) Selection of furnace sizes must be carefully made to prevent use of oversized equipment (Section 510)
- f) Boilers for single family dwellings are not eligible (Section 540)

Undoubtedly, some of these restrictions will work a hardship on many manufacturers and installers. Considerable ingenuity will be required in some cases to handle the untreated sheets and substitute materials. The critical list has, however, cleared the air of all rumors that have been circulating for several months and the industry has a definite emergency code to use as a guide for coming activities. Homes will still have to be heated. The wholehearted cooperation of every man in industry will insure that the job we have started will be successfully terminated.

In succeeding articles additional details of an emergency installation code will be considered in detail. The first item in the critical list required that the heat losses from the rooms be determined. Hence, in the next issue the short, exact method given in the new Gravity Manual of the National Warm Air Heating and Air Conditioning Association will be explained in detail.

# Kramer Reduces Duct Costs

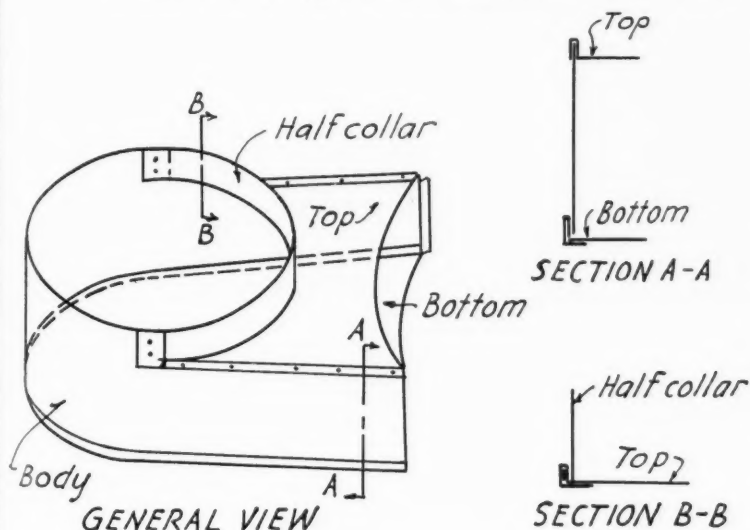
By *Simplification*  
Plus *Standardization*  
Plus *Quantity Production*

**K**RAMER Sheet Metal Works is the firm name of the organization owned and operated by Frank Kramer of Milwaukee. And Frank Kramer, local and state association members will tell you, has long been recognized as one of the true pioneers in simplification and standardization of heating duct systems. To complete the introduction, Frank Kramer has for several years kept an exact cost system on his duct work and without doubt, therefore, knows to the penny or the fraction of a penny just what a certain fitting or piece of duct work costs him to manufacture by his methods.

That Frank Kramer's methods of fabricating are time and cost saving is indicated by the fact that quite a number of Milwaukee furnace contractors buy their duct systems from Kramer and pay less than the same duct work would cost them to fabricate in their own shop.

## Few Sizes of Pipe and Fittings

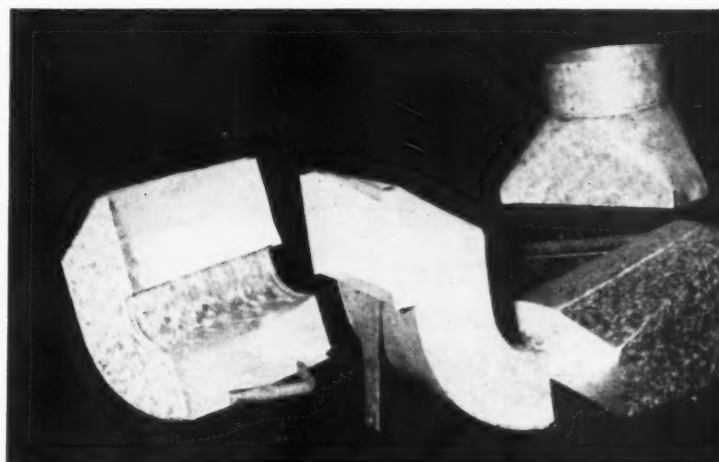
Both standardization and simplification are a part of the idea. All main duct sections are standardized at 8 inches deep. Branches which run across joists are standardized at 6½ by 6½ inches with a 6½ to 8 inch transition to take the



Frank Kramer believes his low cost, shop made, galvanized iron register frame made on the bar folder and soldered in a bench fixture is completely satisfactory and one of his best cost-saving ideas.

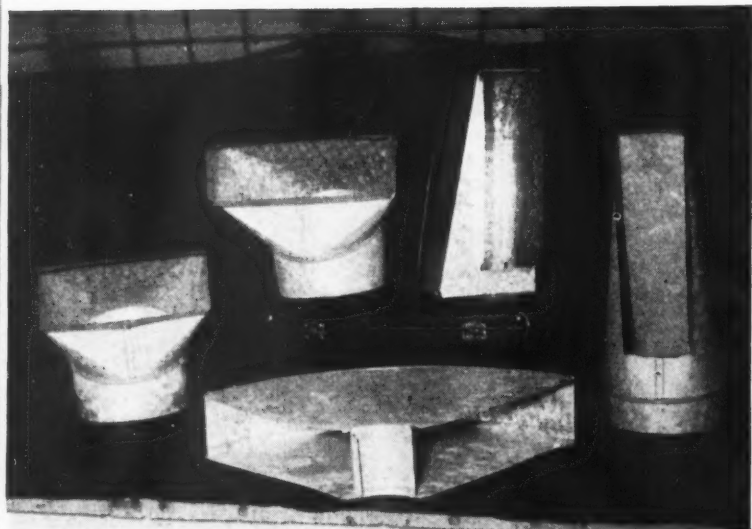
branch out of the main. Branches which run between joists are 7-inch round pipe which not only standardizes the size but also simplifies the installation because no other size is used.

There are two standardized sizes of wall stacking—3½ by 10 and 3½ by 12. Two other sizes are used infrequently, but are made up to special order only—3½ by 8 and 3½ by 14. Usually, if a Kramer job requires a stack larger than 3½ by 12, two stacks—each 3½ by 10—will be installed thereby getting better distribution and saving cost by eliminating the special size of stack, boot, head, register.

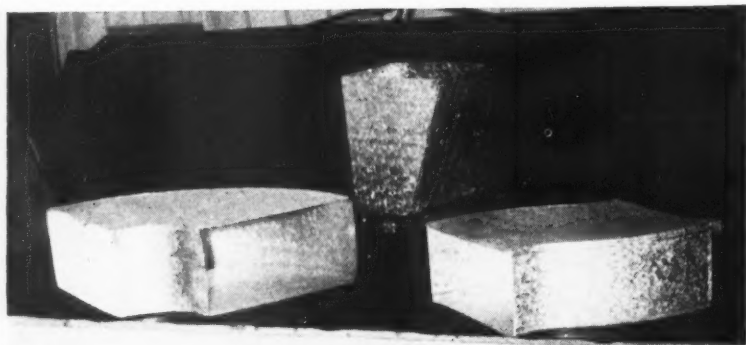


Above—Left to right: Cold air 3½ by 12 to 12 by 6 grille and same reversed, both with register box integral with elbow. 3½ by 12 to 6 by 6 branch. 3½ by 12 to 7-inch round branch transition. All these made in 100 to 300 quantity.

Left—Kramer is proud of this ready-nesting cold air boot. Bottom is cut out and flanged to enter a Pittsburgh. Body is cut down 2 inches along top edge for all its girth except one half the circumference of pipe opening. A half collar is seamed as shown. Boot is left in two pieces—top and half collar in one section and bottom and body in another to make easy nesting.



In foreground—45-degree stack sweep. Left to right—7-inch round to 3½ by 10. 7-inch round to 3½ by 12. 3½ by 12 to 6 by 6 branch. 7-inch round to 3½ by 12 stack (end of pipe). All made in lots of 100 to 300.



Trunk line fittings are made up special for each job, but are standardized at 8 inches deep. Usual construction is a Pittsburgh at each corner.



Warm air branch fittings left to right—3½ by 12 to 3½ by 12 stack elbow and 45-degree turn; standard branch takeoff from a 10¼ by 8 main to 7-inch round branch. Behind—5 by 8 to 7 inch round and 7-inch round elbows which are bought.

Much of the duct work has been simplified through elimination of many fittings. For instance, a standardized rectangular to rectangular fitting takes the across-joist branch out of the main by reducing the main 2½ inches after the takeoff, or stated the other way round, makes a fitting 2½ inches larger than the junction at the main. All through a Kramer system similar simplification has been applied to the design to reduce the number of special fittings which might

be called for if duct work was not standardized. This simplification of design and fittings is clearly shown in the photographs of simplified and standardized fittings.

Further to reduce cost of manufacture, the shop makes up these standard items in large lots. For instance, cheeks in elbows or turns are stamped in a press in 500 to 5,000 pieces at a run. Wall stack will be made up, seamed and papered in 1,000 feet quantities. Complete fittings are assembled by the shop crew and placed in bins so that at least 15 complete jobs are always ahead and when possible 100 to 300 pieces such as transitions, elbows, turns, heads, boots are in stock for delivery to the job or customer.

### Special Fittings Speed Erection

As might be expected, this study of standardization and simplification has lead to the adoption of several excellent fittings which make installation quicker or easier or which reduce cost. One photograph, for example, shows Mr. Kramer holding a register frame made of 24-gauge galvanized iron; the pieces are made on a bar folder and are then placed over a special jig and soldered at the four corners. The resulting cost is a fraction of the usual steel frame—maybe not so good, but certainly competitive.

Another special is the cold air combination head and elbow to make the box for a 12 by 6



The combination stack-from-branch-elbow and register box has the cheeks flanged and the front and back Pittsburgh'ed.

register from a 12 by 3½ stack crossover or from a 6½ by 6½ to 12 by 3½ transition from a branch. This combination is made in S and U forms to take the stack or branch from either side of the beam. The four pieces making up this simplified set are shown in one photograph.

Another special is the cold air boot for connecting a drop round pipe into the casing. The sketch shows construction—the bottom which is flanged to enter a Pittsburgh in the side; the side is one piece wrapping all around and Pittsburghed top and bottom to take the bottom and top pieces; the top which is outside rolled in an edging machine to get a seam into which the collar is slipped and squeezed; the collar is just a collar. Kramer likes this boot because it is low in cost and easy to make and of equal importance—the side can be seamed to the bottom and so nested while the collars and tops can be piled—result: many boots can be stored in a small space.

#### Jobs Picked Out of Stock

When a job comes into the shop all the standard fittings and sections are taken from stock; then the straight sections needed to fill in are made up and the duct work is ready to deliver. The engineering department, knowing that standard fittings will be used, wastes no time in designing "tricky" systems which have numerous "special" fittings to be laid out in pattern and cut and assembled. Since competitors use the Kramer ducts, the result of simplification must be satisfactory.

Frank Kramer firmly believes his simplification and standardization reduces shop and field costs. His records show how much—in his own business—but because he has long been an association man he is reluctant to publish these costs for his fittings. He believes, instead, that any good mechanic can duplicate his ideas and if the pieces are then made up in quantities the resulting costs will be stronger evidence than quoted figures.



Stacks are papered so a special pasting bench has a roll of paper at the end and a metal top to make pasting quick and least messy.

Frank Kramer also believes, "Sometimes publishing cost figures leads a man to feel that if Jack can do it for that sum I can too—result: too low quotations without the actual shop practices necessary to really bring costs down to Jack's figures."

Probably the clearest picture of the Kramer simplification is shown in the photographs where warm air, cold air, stacks, and other parts of a typical residence installation have been grouped to show the use of each piece.

Lastly, Frank Kramer believes that the contractor should begin cost reduction by deliberately standardizing his layouts so as to use the fewest possible pieces. Some "nice fittings" will have to be sacrificed. Some "beautiful engineering" will have to go by the boards. Some runs of pipe

(Continued on Page 103)



Left—Mechanic Rudy Randa laying out straight sections and special fittings for a job. All standard fittings have been picked out of stock. Note straight sections are cross-broken. Right—Superintendent Jordan is responsible for the special cold air boot described and has also been largely instrumental for developing the standardized and simplified items which make the Kramer line so practical.

# Inside Wall Returns Were New—20 Years Ago

By Henry C. Bitter

**T**HE paramount subject before all of us today is the conservation of materials for defense. The question is—how can we use less material and still do good heating?

Now we know that it requires approximately 150 cfm to deliver or convey 10,500 Btu at 135° F. at the register and that it will require about 64 square inches free area to deliver this amount of air at 350 fpm, which is the velocity permitted in low register mechanical jobs. This will require a 12x6 register with equivalent duct size.

We also know that it takes a 10-inch pipe with a 10x12 register to deliver 9,100 Btu in a gravity job, if that pipe has but one elbow and is six feet long. If that pipe is four feet long it will convey 9,400 Btu; and if it is 12 feet long and has two elbows, it will only deliver about 8,300 Btu.

The answer to our first paragraph question is obvious. It behooves us to lay out our jobs with both the warm air outlets, and the cold air returns, as short and direct as possible.

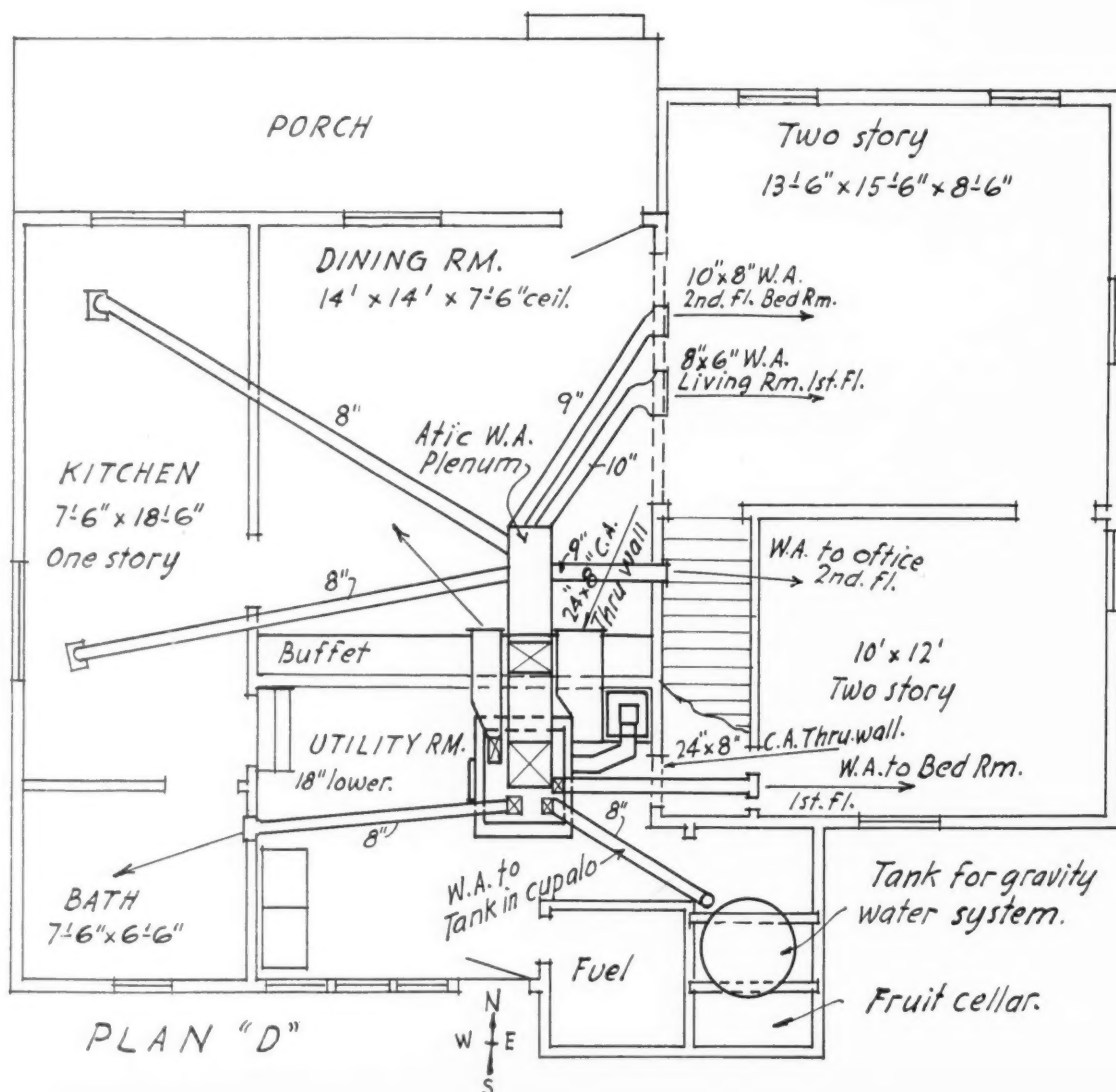
So far as warm air outlets are concerned, all

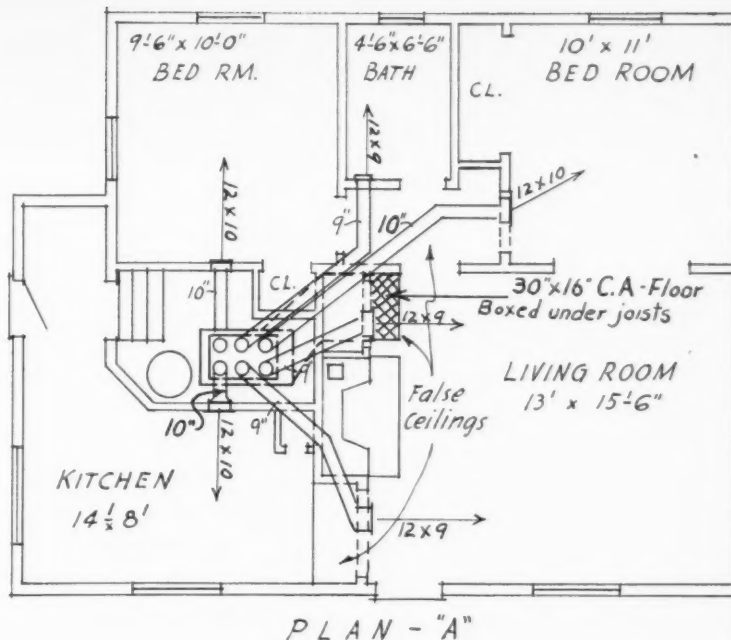
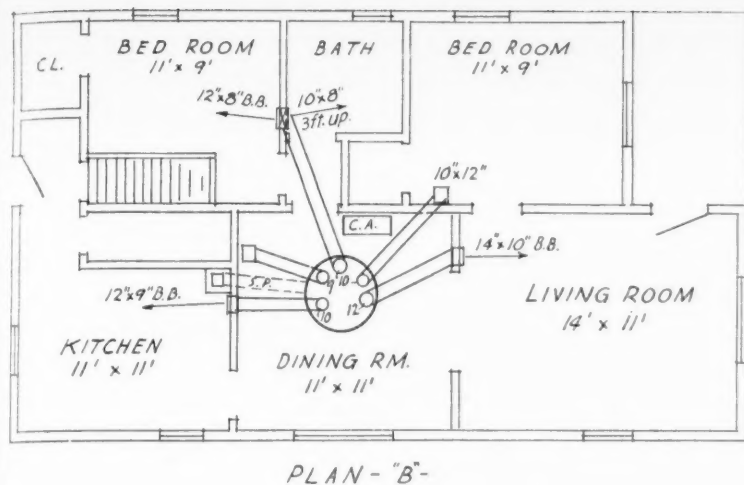
will agree to use as few as practicable and we will run them as direct as possible. But there seems to be a widespread idea that returns must be placed on outside walls and that one return from each major room is absolutely essential.

Nothing could be farther from the truth. As proof, many of us can remember when the "Engineering Experiment Station" at the University of Illinois, through Professor Willard, then dean of engineering, told the industry that in a test just completed, cold air returns at the inside walls had been found to be fully as efficient as if they were on the outside walls, which until that time, had been the universal custom.

Since that announcement more than 90 per cent of my layouts, both gravity and mechanical have been done with "inside wall" cold air returns. Efficiency is more than par and there is a very appreciable saving of material, and also on labor.

In further proof consult your Standard Code Application Manual for Gravity Warm Air Heating Systems. Turn to page 11; look at "Type A"





## [Defense House Heating]

and "Type E" return air ducts. Now turn to page 9 and you will find that a 14-inch pipe in Type A, delivers more air than an 18-inch pipe in Type E.

For those who don't have this manual: "A" is an inside wall cold air direct to the furnace, while "E" is a joist pan dropping into a box, containing three 90 and two 45-degree turns.

As still further proof that inside returns work and are not really new, three plans are shown, of actual houses heated by this method.

### Basementless Bungalow—One Return

Plan "A" is a bungalow without basement, a gravity job which has been operating about 5 years. The heat loss is approximately 45,000 Btu or about the size of one of our smallest "defense" houses. I am told that the peak fuel bill has been slightly under fifteen dollars. The furnace is a BAC series, Moncrief. Registers are flat flange vertical bar type. Registers are placed near the ceiling and warm air collars are cut into the top of the high bonnet. The air velocity is greater than in most basement gravity jobs. Leader pipes are Standard Code plus 25 per cent.

### Gravity Furnace with One Return

Plan "B" is a standard bungalow having a basement and heated by a gravity job installed some years ago. The installation probably complies with present day demands in material economy and one return air grille. Wherever possible I have used a flat top bonnet and cut the warm air outlets into the top, and have found that the velocity gained in the additional foot "straight up," more than offsets the conventional one inch rise per foot. This method also adds to the head room around the furnace.

### Farm House—Two Inside Returns

Plan "D" is a typical farm home with a two

story gable facing the road, a one story wing to the right. Vintage of 1870. The entire structure except the sash, shingles and siding are of native red elm, oak and white ash. There is no basement. The utility room floor, part of which used to be the back porch, is 18 inches below the first floor level. Because the understructure is "barn framing," the only insulation consists of furring and 1/2 inch Insul Board throughout the interior, and storm sash.

There are thousands of similar homes throughout the country which are overlooked by the rank and file contractor. Also, this is my own home and a job whose operation and functions I know most intimately.

While this is being written (January) in my sanctum upstairs the mercury outdoors is at zero; wind southwest 22 M.P.H., the living room temperature is 72 F. with the Airguide resting on a coffee table 22 inches from the floor, while it is 70 at the floor. Up here it is 72 on a 30-inch table and also at the floor, and, the bonnet temperature of the furnace, is 120 degrees Fahrenheit. The answer to the reason for such performance is, eight air changes per hour.

The apparatus is a standard horse-shoe-type-radiator, cast iron heater and a 2-10 blower. The fire is controlled by a bonnet temperature draft door control, and the blower is controlled by a line voltage thermostat and room temperature. These controls operate entirely separate, yet are dependent one on the other, i.e., the draft door control maintains bonnet temperature; when the room temperature requires, the room thermostat comes and gets it, bonnet temperature lowers, draft door opens and builds up the bonnet temperature. Simple as dad's grindstone. Attention is called to the size, location and number of the warm air outlets. I find that volume at low temperature rather than velocity at high temperature achieves proper comfort.

# Approved Substitute Boards For Ducts

**T**O conserve critical materials—steel and iron sheets; either galvanized iron or black—FHA has accepted the use of substitute materials in *return air runs* of a house heating system.

As this issue goes to press two materials have been accepted by FHA's Washington office and by FHA's Technical Division. These two materials are:

A.R.A. sheets—manufactured by Grant Wilson, Inc., Chicago.

Sal-Mo Ductboard No. 77—manufactured by Sall Mountain Company, Chicago.

The FHA Washington office and the Technical Division have specified the use of these two materials as follows:

Substitute material shall be acceptable in any return air application where sheet metal has been formerly required. Joist spaces used as return air ducts *6 feet away* from the furnace measured horizontally may be panned. The line between the top of the joist and the under side of the flooring must be tight and this tightness can be obtained by sealing the corners. (Editor's note—This sealing can be secured by pasting a strip of asbestos paper tightly into the corner. This strip can be 4 to 8 inches wide, we believe. A board material which will break may not be permitted because if the surface of the board breaks the line is not sealed.)

Joist spaces *within 6 feet* of the furnace measured horizontally must be a full duct or fully lined—top, sides, bottom, with an accepted board.

Return ducts may be constructed of these materials and used anywhere in the system provided the ducts are made in a secure manner through the use of approved metal corners, connectors, etc.

Readers should realize that each local FHA office must place its own interpretation on this ruling. This is necessary in order that construction may conform to local building code limita-

tions. An example is the difference between the wording of the local Detroit Insuring office of the FHA and that of the Wisconsin Industrial Commission for Wisconsin projects.

In Detroit, FHA, in accepting A.R.A. board states:

"A.R.A. sheet material is considered acceptable as a bottom liner for joist spaces used as a return air duct for warm air heating systems up to and within six feet of the heating unit. A.R.A. sheet material will also be considered acceptable within six feet of the heater when the top, bottom and sides of the duct space are fully lined with the same material.

"In addition to the lining of joist spaces, A.R.A. sheet material will be considered acceptable for the construction of return air ducts both within and beyond six feet of the heating unit provided that the duct is constructed in a secure manner through the use of shop-fabricated metal corners, connectors and other fittings recommended by the manufacturer."

The State of Wisconsin, Industrial Commission, approving Sal-Mo No. 77 requires that the following conditions be complied with:

"1—The joist space shall be completely lined with the approved board. That is, the top and sides of the joist space as well as the underside of the joists shall be covered with this material.

"2—Metal butt strips shall be provided for all joints in the sheet which form the underside of the duct.

"3—The lining shall be made as nearly air tight as possible by using metal corner strips for the connection between the top and sides of the lining."

In the May issue we will publish sketches, photographs, diagrams, and full construction information on just how substitute boards are being installed in the field.

## Heat Loss Through Sewer Tile

**T**HE heating engineer of a large heating organization submits the sketch accompanying and would like to know—"What is the correct method of figuring the heat loss in this type of return using—

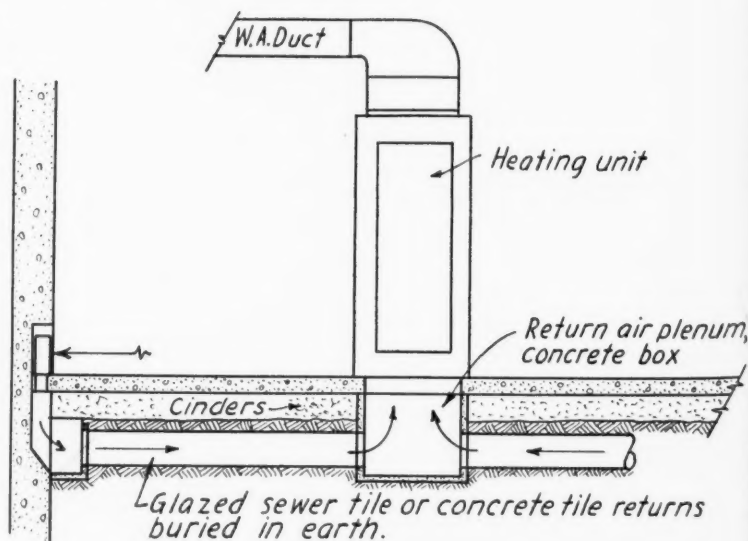
1—Glazed sewer tile

2—Concrete tile (not light weight aggregate)"

These return systems are being used in the engineer's area in small low cost housing where the furnace is a utility room located high-boy.

The engineer feels that there must be considerable heat loss from the tile resulting in return air reaching the heater below the customarily figured 65 degrees. If such is the case, this extra heat loss should be added to the heat loss of the house in sizing the unit.

If any readers have had experience with such construction their reports will be appreciated.





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# SHEET METAL

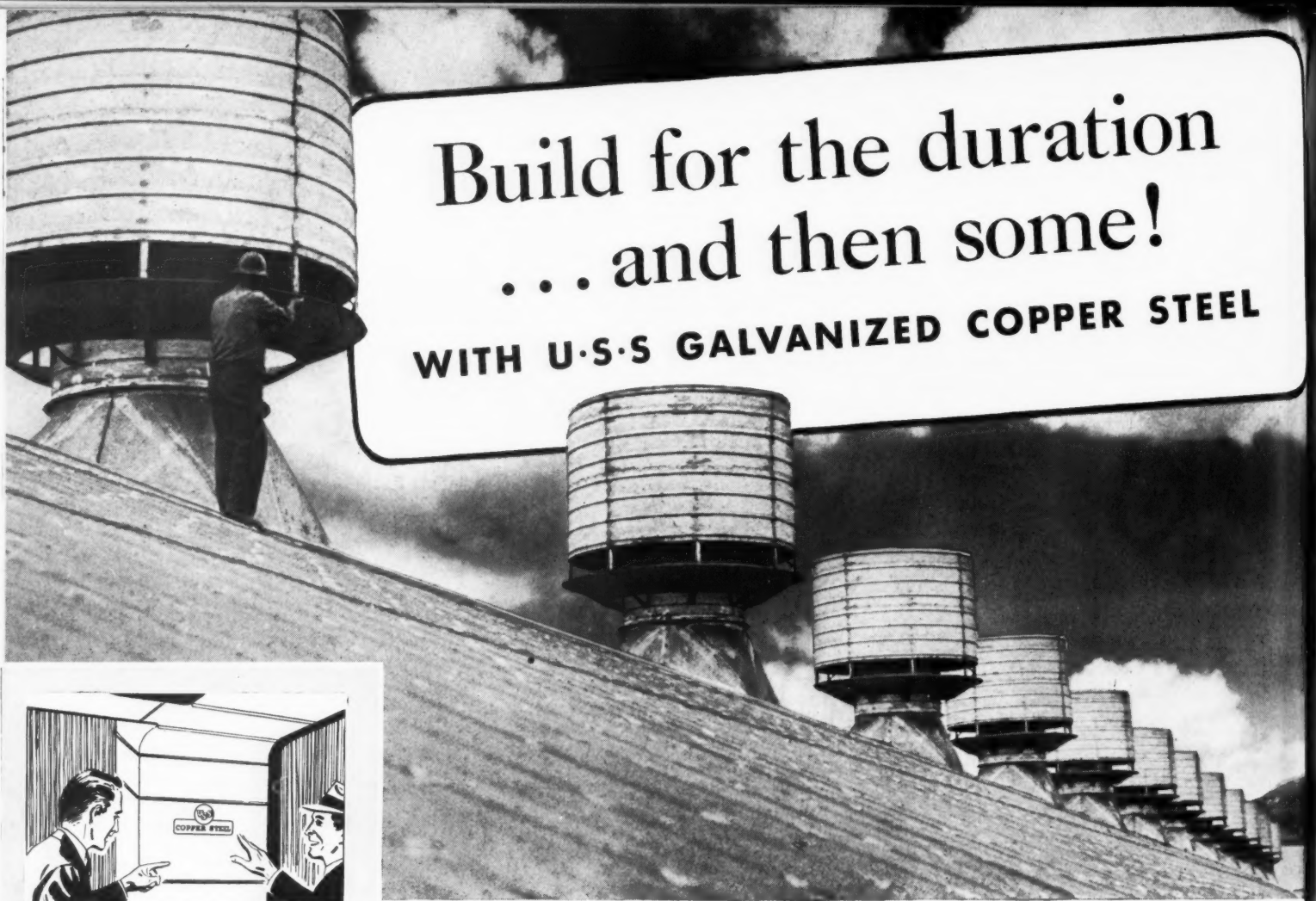
S E C T I O N



DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING

# Build for the duration ... and then some!

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**STEEL AIR DUCTS** should last as long as the building itself. Make sure they do by using U·S·S Galvanized Copper Steel. It will be easy for you to get true bends, tight seams and neat joints.



**GUTTERS AND DOWNSPOUTS** for defense housing will resist atmospheric corrosion much longer if they are made of U·S·S Galvanized Copper Steel.

### SPECIAL NOTE:

U·S·S Stainless Steel has been especially popular in the sheet metal field because of its strength and high resistance to corrosion. But now production for war requires all available Stainless. If you are working on vital war materials and have received the necessary clearances, we can give you prompt shipment of the U·S·S Stainless Steel you must have in the industry's widest range of sizes and shapes.



**W**HETHER you are a prime contractor or a sub-contractor, you can help to put teeth in our war effort by doing everything you can to build necessary sheet metal structures better and faster. Your customers count on you to produce structures that will last for the duration—and then some!

U·S·S Galvanized Copper Steel is a "natural" for the kind of jobs you're working on now. It fabricates easily into difficult shapes. You'll save valuable shop-hours and shorten your completion time. And important, too — you can promise your customers that the base metal has 2 to 3 times the rust resistance of plain steel at only slight additional cost. Official A.S.T.M. test reports prove this.

Now's the time to build extra-life into your jobs by taking advantage of Copper Steel's extra resistance to atmospheric corrosion. This is your opportunity to strengthen your reputation by

protecting your customers against untimely replacements or repairs on ductwork, ventilators, roofing and siding, downspouts and flashing.

Whatever your individual structures require, you can select the right material from the complete line of U·S·S Sheet Steels. These include: U·S·S GALVANIZED; U·S·S PURE IRON; U·S·S GALVANIZED COPPER STEEL; U·S·S COPPER STEEL for 2 to 3 times the rust resistance of plain steel; U·S·S PAINTBOND — a galvanized, Bonderized sheet that permits immediate painting and holds paint tighter (in the South and West U·S·S Dul-Kote, a product with excellent painting properties); U·S·S VITRENAMEL for porcelain enameling; U·S·S STAINLESS STEEL to reduce weight and assure high corrosion resistance.

Write to one of the companies listed below for further information on any of these steels.

## U·S·S STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*

COLUMBIA STEEL COMPANY, *San Francisco*

TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

*Scully Steel Products Company, Chicago, Warehouse Distributors*

*United States Steel Export Company, New York*

# UNITED STATES STEEL



Nozzles for the 28 slots that supply conditioned air to the main lobby. These nozzles will be located in a moulding and will be invisible from the lobby. (This photo and all others by Fay Foto Service, Boston)

## New England's Biggest Duct Job—500,000 Pounds

By F. R. Ellis

Buerkel & Company, Inc, Boston

THE new home office building of the New England Mutual Life Insurance Company, in Boston, Mass., is a granite-faced steel and concrete building, having a floor area of 315,000 sq. ft., and consisting of two four-story wings, and a connecting 10-story wing with a central tower, which contains the elevators. The first floor is rentable area for branch banks, service offices, shops and stores, and also contains an auditorium seating more than 900 people. The basement is generally assigned to the store areas of the first floor. Sub-basement is arranged for the parking of employees and tenants' automobiles. Most of the air conditioning, electrical and plumbing equipment is also located in the sub-basement in several apparatus rooms.

All of the rentable store and office space is completely air conditioned. Due to the design of the building, and its occupancy, the air conditioning is divided into seven systems, with seven return air and exhaust systems. There are several toilet and exhaust systems, and three systems of

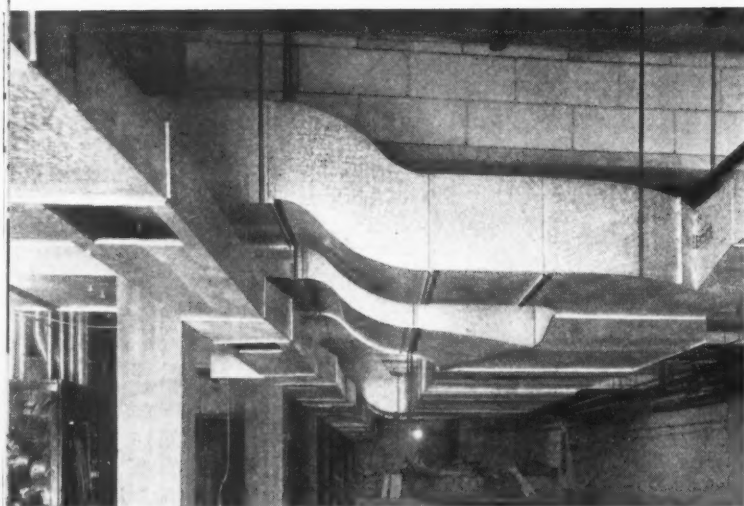
fresh air and exhaust for the parking space, and machinery rooms.

Almost 500,000 pounds of galvanized steel was used in the fabrication of the ducts, and air conditioning apparatus housings; and the sheet metal contractor was on the job for 12 months. Ducts vary in size from 12 inches by 4 inches to 120 inches by 30 inches; gauges of metal varied from No. 26 to No. 18.

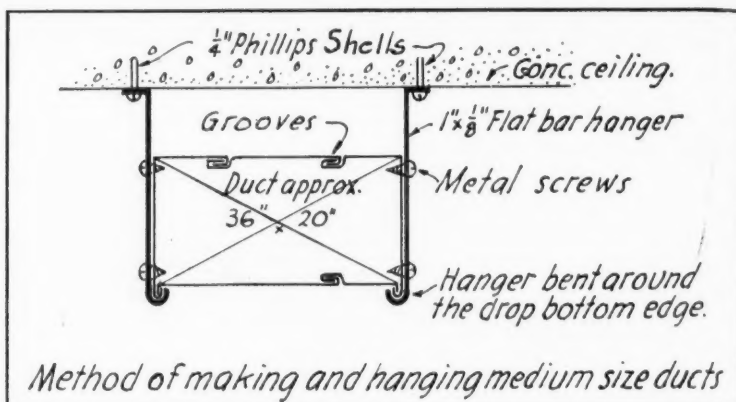
The fabrication and installation of the sheet metal work presented very interesting problems.

The air conditioning system, considered as a whole unit, is probably the largest air conditioning installation in New England and the sheet metal contract involved is possibly the largest single duct contract let in the area.

Architects for the building were Cram and Ferguson, Boston; designing mechanical engineers, including the air conditioning, ventilating and heating systems was Buerkel & Company, Boston; the sheet metal contractor was Stanley E. Priggen Company, Cambridge, Mass.



Note—Each branch from a main is fitted with an adjustable deflector and locking type quadrant volume damper.



Left—Fresh air and exhaust ventilating ducts in sub-basement for ventilating the parking space. Right—General construction of all “medium sized” ducts shows grooved double seams longitudinally and standing seam cleats around the duct. This size duct was erected as a full section.

The procedure and methods adopted by the sheet metal contractor led to the successful completion of his contract on schedule and enabled his mechanics to install the hundreds of small branch ducts required in step with the concrete men and to erect the very large and very heavy main ducts with a minimum of hours of labor and interference with building progress as a whole.

One of the first decisions to be made was how to hang the ducts; it was decided to use self drilling expansion shields, rather than to place in the concrete forms, the thousands of inserts that would have been required. Standing seams, Pittsburgh lock and groove seams were used in fabricating the ducts. Much of the duct work was made up in 8 foot lengths, with internal single and double longitudinal standing edges with drop bottom and button locked. (See sketches.)

#### Job Shop Used

A complete sheet metal shop was set up in the sub-basement. Its size can be judged from the fact that 33 men were employed during most of the time, and that the shop contained 3 brakes, a

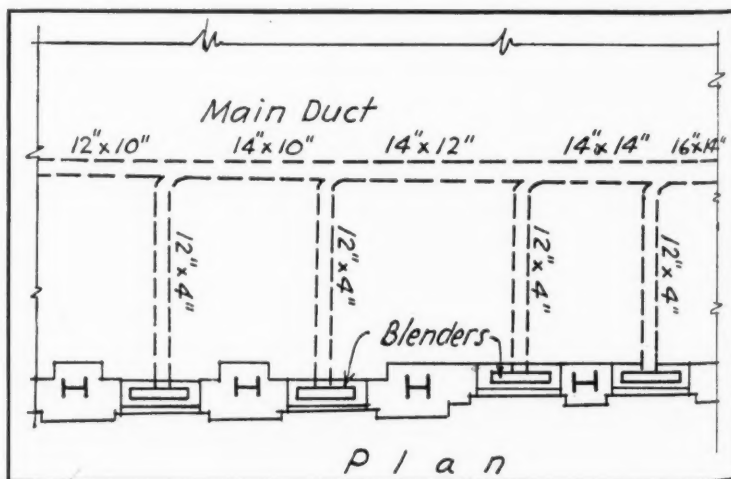
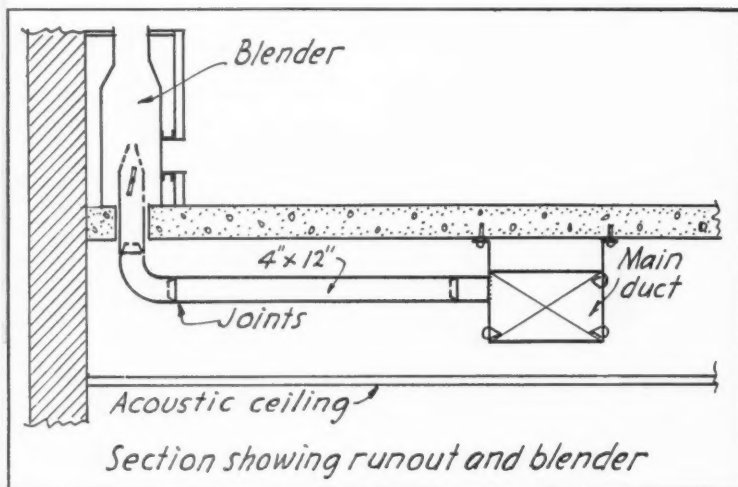
Pittsburgh lock forming machine, 8 foot and 3 foot squaring shears, angle cutter, a pneumatic hammer, and a beading machine.

Draftsmen were used to take measurements, which were from column lines and building center lines. The duct work was made immediately from these measures.

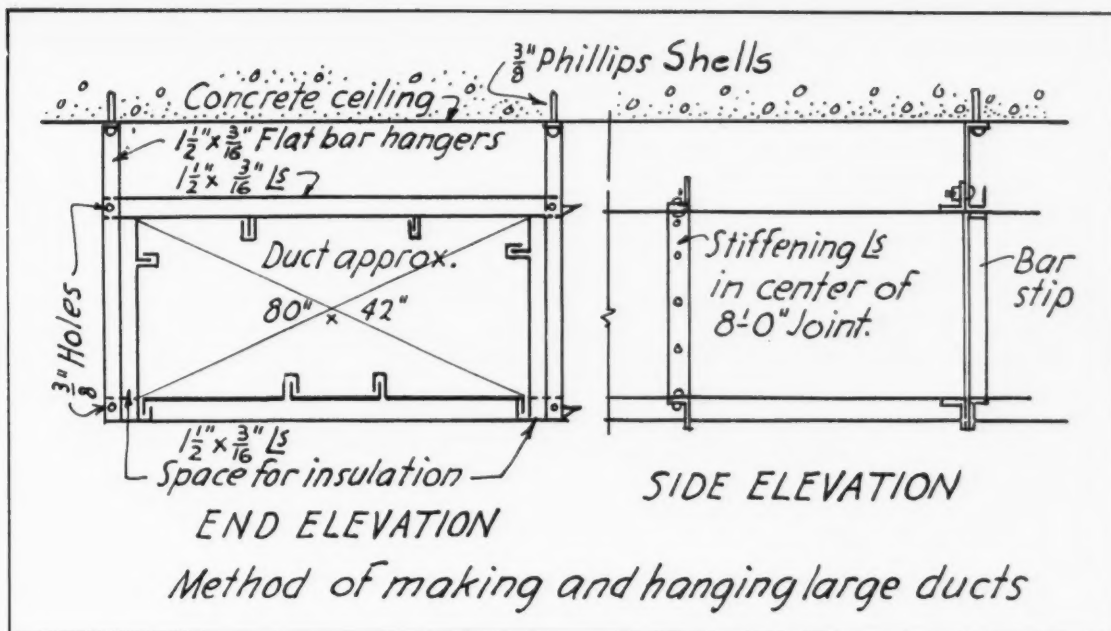
#### General Erection Procedure

In general, the duct work was assembled and installed to keep progress with the building construction. While the steel work was going up, considerable duct work was installed in the basement and sub-basement, but as soon as floors were poured and forms stripped, duct work on the upper floors was started; the result was the basement and sub-basement work was left unfinished until after the upper floors were done. This was to avoid delay in hanging the ceilings.

The design and construction of the large main and small branch ducts is clearly shown in the drawings and the photographs. In each case the aim was to make erection as easy and rapid as possible and to keep weights of pieces handled



One of the interesting features of the job are the 584 “blenders” (shown left) served by 584 identical branch lines which leave the main as shown at the right. The high velocity air induces a secondary air flow into the heating coil and the mixture passes out the top of the cabinet.



well within the limitations of the two men who usually formed an erecting crew. Small ducts (see sketch) were erected as complete sections in as long lengths as could be handled by the crew and within the space traversed. Large ducts were made up in pieces as shown in the sketch and then pieces for the top and the two sides were put together for a section on the floor and hoisted in place with block and tackle. Then the assembled bottom was raised into place as a drop bottom and button punched to the sides.

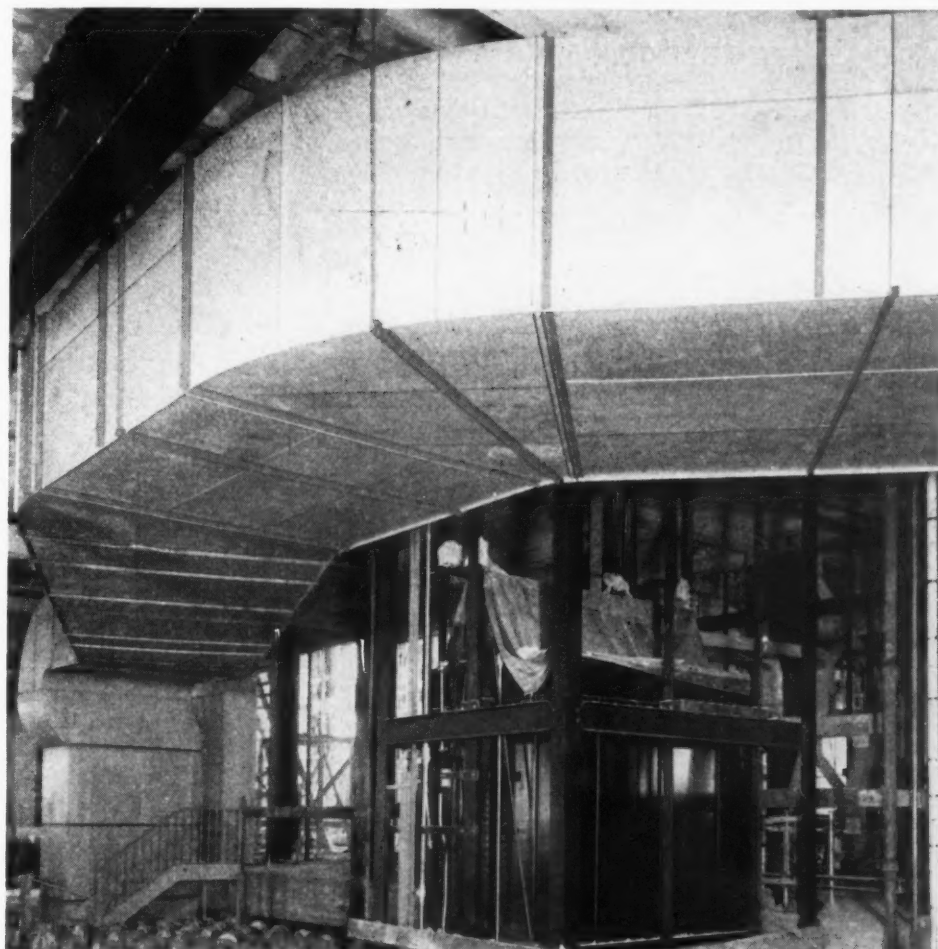
For ducts of all sizes the erecting crew worked from extension horses and plank scaffolding.

#### Blenders

One of the interesting features of the air conditioning system is the use of "blenders" in each space conditioned. These blenders, as shown in a sketch, are special convectors through which the supply of conditioned air is delivered to the rooms. The unit is located beneath a window with a conditioned air grille in the window

Above is shown construction of a typical "large" duct made with inside standing seams on the four sides. Note seams placed to give a bent corner. The top and two sides were assembled and erected and then the drop-in bottom was placed. Right—Typical large duct—in this case the fresh air duct across the first floor corridor with a stack to the equipment in the sub-basement.

Note—Every place a duct passes through a fire stop wall or floor an approved fire damper was installed. Hundreds were used on this job costing many thousands of dollars.



stool. Air conditioned in some central station is introduced into the bottom of the blender (see sketch) at high velocity. The venturi effect thus created pulls room air into the unit through the front grille and this room air passes through the unit coil to be heated when heat is required.

Use of this method of room conditioning requires a branch duct to each blender; the branch tapping from a main. In the New England Mutual Life Insurance building, sheet metal contractor Priggen had to fabricate and erect 584 of these identical branches.

These 584 12x4 inch branches to the air blenders were made up in 8-ft. sections. The turn up elbow to connect to the blender stub was separate. The stub through the floor was furnished as part of the air blender. No special procedure was necessary for erecting these branches. They were hung with flat bars from Phillips shells.

The 12x4 branches were cut into the main with dove tail collars.

The air blenders were furnished with a collar on the bottom extending through the floor to attach to the 12x4 branch duct, also a collar at the top to extend to the window stool and the grille. The inner casing of the blender is galvanized steel. The enclosures for the air blenders were furnished by Johns-Manville, and were of transite.

#### Large Duct Procedure

In general, on each floor the main ducts which serve these branches to the blenders run down the length of a wing along the one-quarter points in the width of a wing. Usually, two mains run through each wing serving blenders along one exposure. These mains vary from 12 by 10 inches to 38 by 14 inches and were constructed as shown in the sketches.

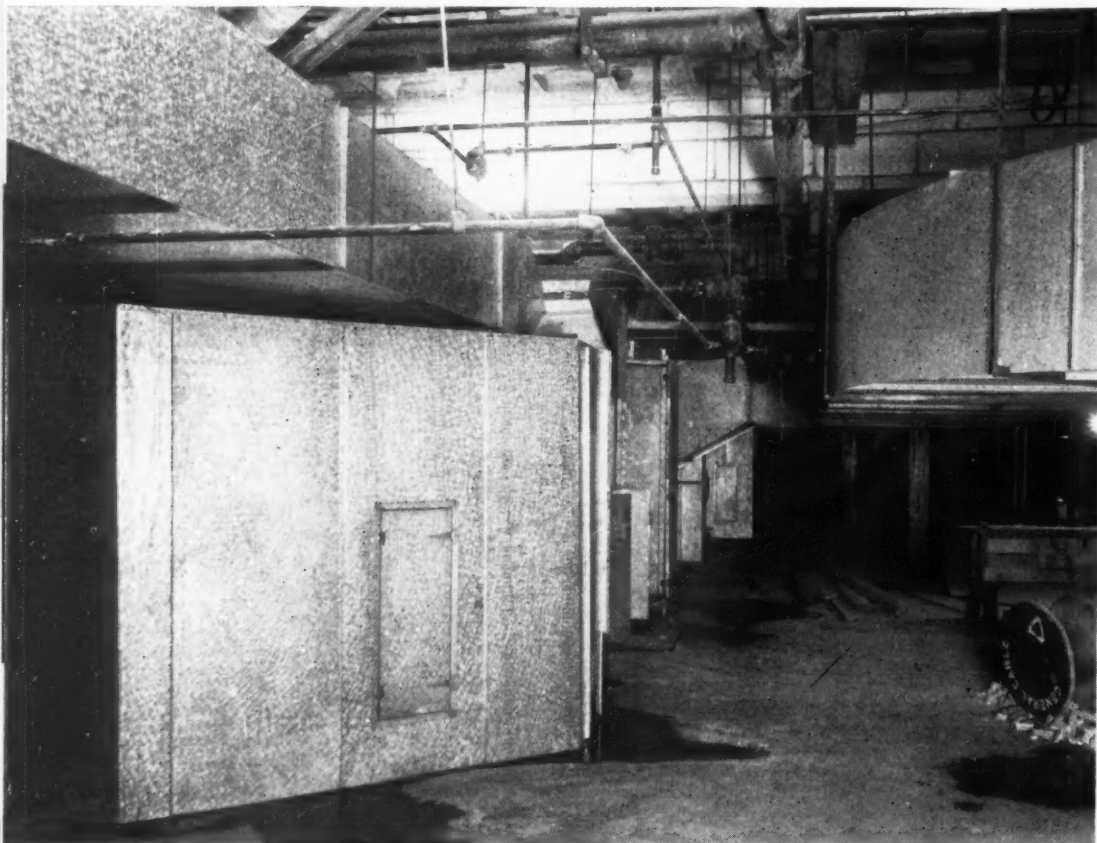
The duct mains pass through opening in the web of the floor girders. There being no interior columns, these girders span the 54 foot width of the building, and they are 36 inches deep. Openings in the center section and quarter sections of the girders were provided for the ducts to pass through. This permitted the ceiling, which was of Johns-Manville sanacoustic panels to be free from breaks or false beam effects, and hung at the maximum height, as it was hung very close to the fire proofing on the girders. It also permitted the light troughs to be up in the ceiling, so the lights are flush with the ceiling.

The floors were pan construction so inserts were drilled into the concrete webs between the pans. Flat bars from the inserts were riveted to the ducts, as shown in the sketches.

For the duct work as a whole, frames were set on the concrete forms for openings in floors and walls. The horizontal runouts for the air blenders were installed and brought up through the floors. Collars were cut in and runouts installed to drop in partitions, although the drop could not be installed until the partitions were laid out and the register or grille located.

#### Equipment Housings

In general, housings for connections between heating coils, filters, conditioners and fans were made of No. 18 gauge galvanized sheets on angle iron frames. Access doors, 18x48 inches into the space between the various parts of the apparatus were of double construction hinged and fitted with locks. Angle irons on the floor, and at the top with angle frames to attach to the heaters, filters, etc., were used as a frame work for these housings. Vertical and horizontal stiffener angles on 3 foot centers were included. (See photograph.)



Return air duct above and conditioned air duct at right in the sub-basement equipment room. Housings contain fans, coils, filters, and were made of 18-gauge iron on angle iron framing.

# Substitute Solders

(Reprinted from Tin)

**T**IN is an essential metal of war. It has also been an essential ingredient of soft solders for many years. Now war has cut off from America its principal source of tin supplies in the Pacific. The government, as a result, has found it necessary drastically to curtail the use of tin in many products including solder.

Solder manufacturers and users are working diligently to find suitable substitutes employing reduced amounts of tin or no tin at all. The degree of success attained can only be determined by actual use of the new solders under operating conditions.

It is hardly to be expected that one new alloy or group of alloys can be quickly developed to replace the standard tin-lead combinations of the past and to do the variety of work those useful alloys have done. It is quite possible, however, that a number of new alloys can be developed, each of which will prove a suitable substitute for certain soldering operations. It may even be necessary to adapt soldering methods slightly to the new alloys.

As an example, tin-free solders containing small percentages of silver and the balance lead are now available. Users report finding these alloys satisfactory for certain kinds of soldering but have had to modify their methods somewhat. They have a considerably higher melting point than most tin-lead solders, but in many instances this is no disadvantage other than to require hotter irons or higher temperatures. In some cases the higher melting point may even be an advantage.

They can not, of course, be very successfully used to join low-melting metals like lead and the plastic range is limited.

Another group consists of various combinations of lead, tin, bismuth, silver and sometimes antimony, the tin content being low. This group of alloys has a much lower melting point than the lead-silver group and a reasonable plastic range. Reports indicate they can be employed successfully for a number of purposes.

In some cases, too, solder manufacturers report that much lower tin content solders are proving satisfactory for some purposes where a higher tin content was formerly thought necessary. For instance an alloy of lead with only about 10 per cent tin and small amounts of phosphorus and other additions is being used for dip soldering operations and for tinning copper.

Study of fluxes is just as important as study of solder alloys. For instance, it will be found that some of the new solders will require different fluxes. Therefore, in trying out new solder compositions, different fluxes should also be tried if those formerly used do not prove satisfactory.

Solder users may also, by close examination of their operations, be able to reduce the amount of solder used per joint and, in some cases, the number of joints. It may be possible to substitute other methods of joining for soldering during the duration, even though this may increase cost or prove somewhat less satisfactory.

The table lists some of the solders mentioned in this article and gives some of the properties they are reported to possess.

SOME AVAILABLE LOW-TIN AND TIN-FREE SOLDERS

COMPOSITION, PER CENT BY WEIGHT					LIQUIDUS	SOLIDUS	TENSILE STRENGTH	BOND STRENGTH OF LAPPED JOINTS	SPREAD OF 1/2 GR.
SN	PB	AG	BI	SB	DEG. C.	DEG. C.	LB. PER SQ. IN.	LB. PER SQ. IN.	SQ. IN.
40	60				238	183	5,660	6,270	1.30
	97.5	2.5			304	304	4,980	3,740	0.19
	95	5			375	304	4,915	4,340	0.20
10	90				298	183	4,850	4,960	0.27
10	87.75	2.25			290*		4,950	5,000	0.41
20	80				275	183	4,940	5,680	0.37
20	78	2			267*		5,620	5,550	0.57
30	70				257	183	5,390	5,770	0.83
30	69	1			251*		8,810	5,620	0.86
15	78.5	1.5	5		264*		4,960	5,310	0.47
15	77.5	1.5	5	1	258*		8,000	5,090	0.29
20	74.85	1.5	3	0.5	258*		8,120	5,380	0.39

NOTE: Bond and spread tests were made on copper sheet. Tensile tests were made on chill cast strips of the alloys.

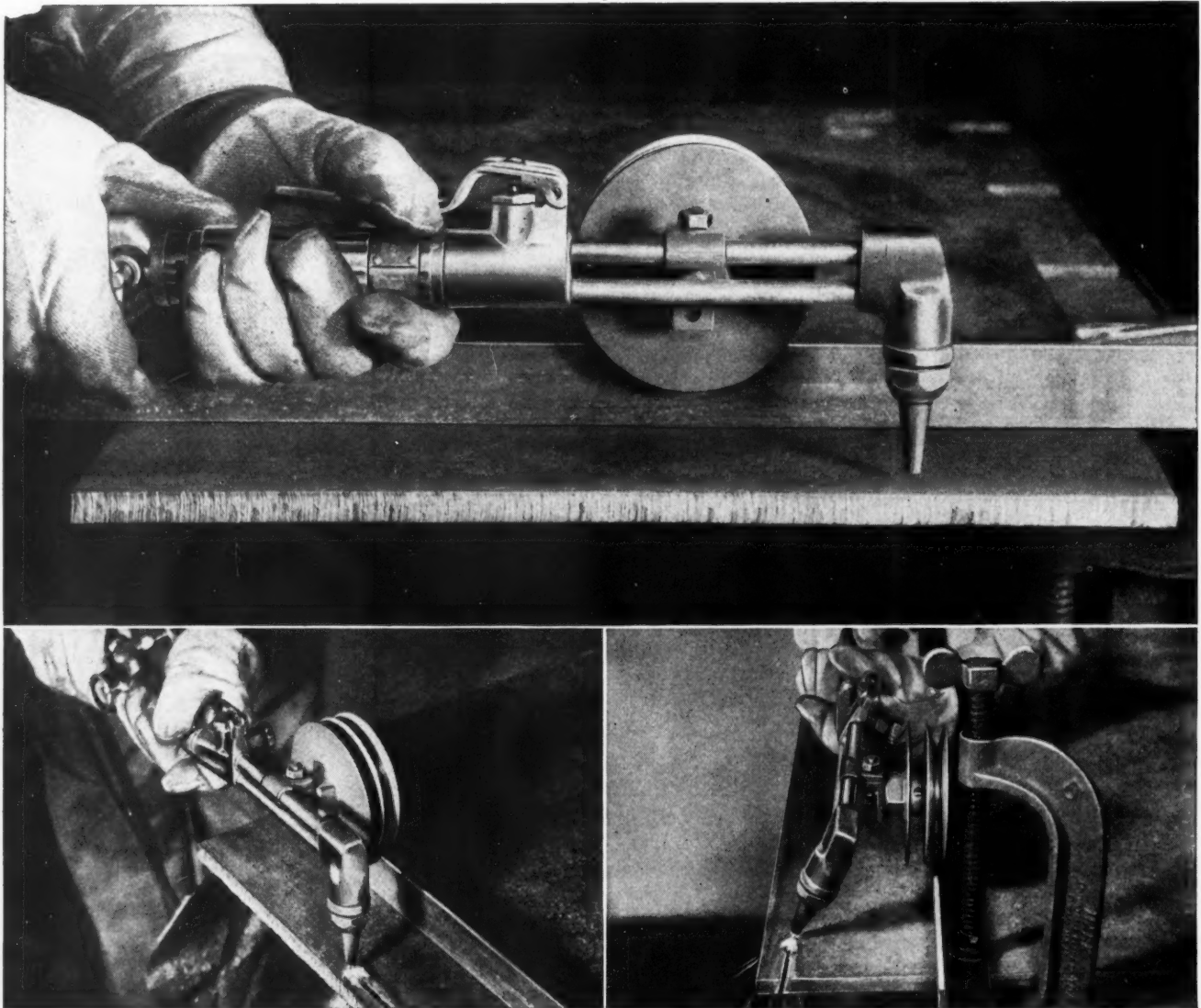
\*Determined in this investigation from cooling curves—other temperatures from literature.

Above data from Metals & Alloys, March, 1942.

Conventional 40-60 tin-lead solder is included in the table for comparative reasons.

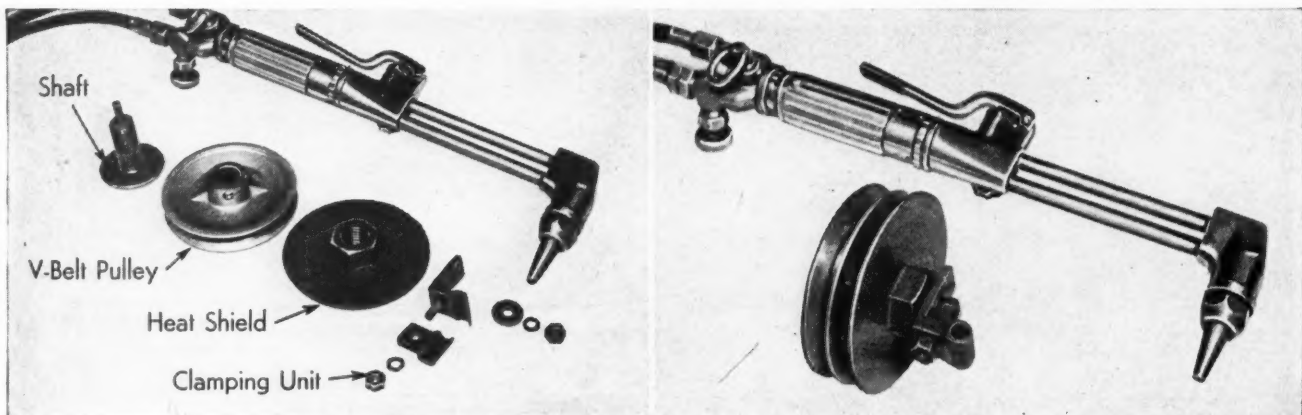
# Simple Devices to Improve Cutting Accuracy

[Reprinted from Oxy-Acetylene Tips]



This simple guide for straight-line cutting consists essentially of a V-belt pulley wheel which attaches to the blowpipe and rides on an angle iron. Between blowpipe and pulley is a disk of 1/16-in. steel which serves as a heat

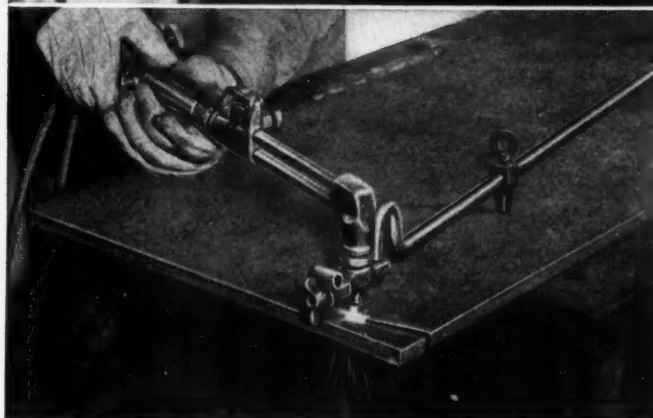
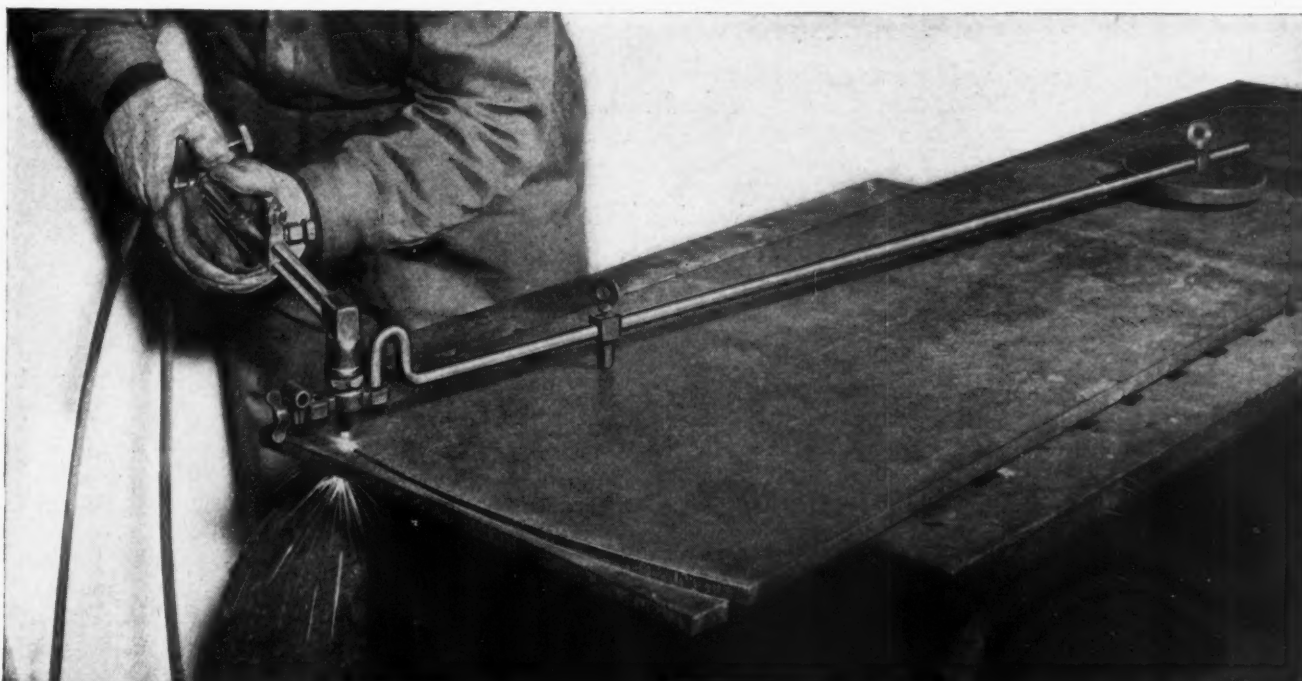
shield. The shaft consists of a 3/4-in. machine bolt with washer welded in place of the head. The 3/4-in. hex. nut is bronze-welded to the heat shield. The clamp is made by splitting a piece of 1/4-in. pipe and welding the parts to two extension pieces.



THIS article describes a number of devices that can easily be made in any shop for further increasing the scope as well as the accuracy of the hand-cutting blowpipe. With these devices, shops not equipped with a cutting machine can handle a wider range of work with greater facility.

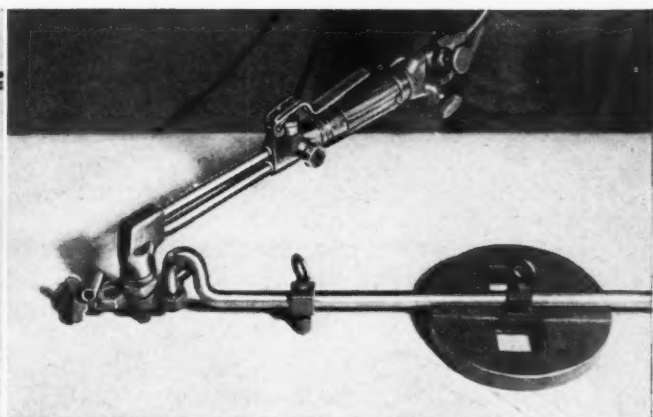
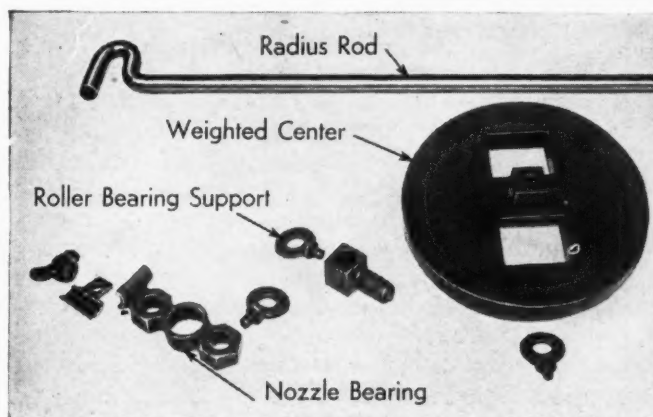
As illustrated there are 2 devices—one for

straight lines and one for large circles. Each of the devices can be easily and inexpensively constructed out of readily obtainable materials, such as stock angles and rods, and bronze-welded bolts, nuts and washers. Not only do they make possible improved workmanship in the cutting of straight lines and circles but also there is a saving in time and gases because the cutting operation is speeded.



This radius rod is designed to cut circles from 1 or 2 ft. up to 10 or more feet in diam. It consists of a  $\frac{1}{2}$ -in. rod to which are attached with setscrews a weighted center and a roller-bearing support. The end of the rod is shaped in the

form of a gooseneck to permit vertical adjustment of the clamping unit for different kinds of tips. The blowpipe bearing consists of a sleeve welded to the standard nozzle nut. As shown, the clamping unit makes possible bevel cuts as well as vertical cuts.



# Fabricating War Products [*Preliminary Procedure*]

This is the first of a new and timely series. The author will select typical articles which can be fabricated under prime or sub-contract, in an average power equipped sheet metal shop, and will show in drawings and text how each article can be manufactured—profitably. This first article discusses the preliminary steps which must be taken before a successful bid may be submitted.

By Ernest E. Zideck

Sheet Metal Consulting Engineer

THE Procurement lists distributed at the close of 1941 showed about fourteen items, required in quantities from 10,000 to fifty and more thousands, constructed of sheet metal, or practical for fabrication in sheet metal shops. These included articles wanted by the Navy yards and the quite numerous ordnance plants and quartermaster corps areas. There were ammunition containers of differing designs, some made of common roofing tin and others were of 20 and 22 gauge steel, one of a considerably complex construction designed to be mounted on machine guns. Then there were a few work benches with drawers for tools or similar articles; one specified to be used both in a truck and outside of it, doing work on the bench as the occasion calls for. A few heavier gauge contraptions were shown, one being a kind of a telescope and the other a miniature steam shovel.

As the Navy or Army blue prints and specifications may not be used for any other purposes than estimating and manufacturing, the writer is not free to describe, or even name any of the above items, but this restriction will not prevent us, however, from delving into the intricacies of the (so-called) National Defense Contracts, and discuss in this series minutely the constructions specified by the respective engineering departments.

## Bidding Blue Prints Often Inadequate

These departments, in many cases, were aware of the inadequacy of their prints and specifications and so added notes advising the bidder that "common practices or methods of the trade will be considered instead of adhering to the draft or specification, and that a *sample* made up by different methods than were specified, if in other respects satisfactory, will be accepted as a model to which the article may be manufactured in quantity.

This same leniency has been shown in the "tolerances" specified; the engineers not taking

into consideration, initially, that in sheet metal fabricating five thousands of an inch, plus or minus, is the closest tolerance obtainable. It was also pointed out that sheet metal sheared "to size" will invariably show a slanting cut, a "creep", which grows with increased thickness of the metal and, owing to the nature of shearing blades, may be less at the ends of the blank and more so in the middle. Again, the sheet is non-existent which does not show variance in its thickness and the formative processes must, on that account alone, show slight variations, though these need not exceed three thousands of an inch in metals above the eighteenth gauge. This being so, the "micromatic" inspection of the product fabricated of sheet metal, alluded to in many of the initial prints and specification, will be voided if the bidder makes proper representations to the respective engineering department.

In the newer prints and specifications from Navy, Army or the number of ordnance plants "tolerances" have been corrected, in many cases *ten* thousandths of an inch being allowed, plus or minus, which is close enough for anything fabricated of sheet metal, especially so in the case of work benches, blue print desks with drawers and many ammunition containers. But even so, the contractor estimating on one of these items must, for his own protection, keep closely to the limits finally arrived at.

## If You Have Ideas—Build a Sample

If a sample is submitted and approved, then it is imperative to reproduce the sample minutely, uniformly, with no deviations from either the measurements or modes of construction. This especially applies to ammunition boxes or containers, because these are handled additionally (filled, sealed, tested), and the covers or parts might be mixed in handling, so that any divergences in parts may result in misfits. Inspection before acceptance might consist of one item out of every ten being closely measured and fitted;

but it also may include the *mixing* of the parts and try-outs for fit in this manner.

Uniformity in the quantity product will necessitate a certain tooling being done. The tooling must be done, anyhow, if we consider that thousands of similar operations may be done by inexpensive (mostly shop constructed) forming tools, in a fraction of the time which the operations will consume if each were done separately on the folder or the brake. The press brake still can be used, though the punch press may operate quicker. The press brake can be equipped with multiple formative die-sets, several men handling the blanks, so that many operations will result at one stroke. This same arrangement may be had in diverse provisioning and binding, the seaming of the boxes (ammunition containers), for instance, feasible of being done by die-sets protruding over the brake bed proper.

It is obvious that the method and the procedure of quantity fabrication must in each case be determined PRIOR to estimating the cost of fabrication. If we devise means of doing the work to specifications in half the time, our costs will be that much lower and we shall be successful in getting the contract. At that, the above referred to tooling, in practically all items wanted in great quantities, may be accomplished inexpensively by the men in the sheet metal shop, with only a fraction of the work let out for machining to close dimensions.

#### Know Exactly What You Have to Do

Determination of the modes of construction and the processes of a step-by-step fabrication of the item; with as many precise and time-saving tools as the item warrants; is the *first* phase of the work required in *bidding* on a defense contract.

The contractor (or his engineer) must *know* the article to be bid on; they must know it in its minutest detail; and they must pre-determine the fabrication of the product, figure out the most accurate and time-saving processes, figure the costs of the means by which to do the work, and then figure the time which it will take to accomplish the fabrication from start to finish. The cost of the material is not difficult to arrive at. At that, where thousands of units are figured on, there may be considerable saving in the costs of the material if we spend time in figuring elimination of waste.

In munition and armaments plants the authorities insist on a plant protection which consists in most cases of a high fence built around the factory and several shifts of plant police guarding the entrances, inspecting the employees going in and out, and a special detachment, in civilian clothes, mixing with the workers in the shop and watching for attempts at sabotage, or interference with production. Obviously, where such plant protection must be maintained, the costs of running the plant increase out of proportion with the salaries and wages paid productive and

administrative workers. In estimating on a Defense item which must be produced under the above conditions the costs of plant protection must be added to the costs of production.

In sheet metal fabricating, however, the product being not much of a secret, nor easily sabotaged or adversely worked, expensive plant protection may be voided, except in the fabrication of parts going into aircraft, trucks and tanks, and similar products. The contractor bidding on Defense items should inform himself beforehand whether, and what kind of, plant protection is prescribed for the manufacture of the item.

#### The Seven Preliminary Steps

From the above we have seen that, if we want to fabricate war articles we must proceed as follows:

1—Obtain from the nearest WPB office lists of items advertised for bidding. Each of the offices has one or several engineers whose duty it is to advise with prospective bidders.

2—After securing the blue prints and other specifications and conditions pertaining to the item under consideration, the contractor must go deep into the construction of the item as disclosed in the prints and specified and must study the article to the last detail, so that the construction *and the intended* purpose of the product is well understood.

3—If the item is small, a box or ammunition container, it is well to construct a sample *exactly* as the prints and specifications call for. In building the sample you may discover difficult, often outlandish construction operations, which you know you could do much better your own way; if so, build another sample, this time the way you prefer to make it (in quantity). Submit the samples to the respective engineering departments, telling your reasons for the construction changes in the second sample, and asking whether this latter sample meets approval so you may bid on the contract with the final sample for base.

4—If the changes you made in the sample show construction improvements without impairing in any way the product wanted, you'll most likely be given *corrected* drawings and specifications, embodying your own items of construction, and you'll be free to bid by these corrected specifications.

5—But should the original specification be insisted on you may as well go ahead, estimating on the original, and bidding on the contract unconcernedly, because, if the original construction is mandatory, your competitors in bidding must do the same as you would be doing, they having no other choice.

6—Do not estimate on anything without first examining the article minutely and thinking out, inventing, the best means and processes for its fabrication. (In this respect your competitor may do a better job and, devising better means and modes, may be in position to outbid you.)

7—In the matter of procurement of tools, if the

article to be bid on is small, boiler plate may be used for formative die-sets, with stems fitting into the press brake, welded on. A great variety of formative and seaming die-sets may be inexpensively constructed in this way, and they may be operated both in the press brake and the punch press.

In the observance of the above suggestions always bear in mind that the engineering forces devising the objects are not infallible and that, if your own suggested construction is so much more practical and cheaper, they will gladly cooperate with you and you'll be following in the steps of the trade, by adhering strictly to the following:

#### First

**PLANNING:** Each certain sheet metal article has been devised for a certain purpose. The designers knew the purpose; they may not have known metal fabricating as you do; you may suggest improvements or easier and cheaper methods of construction. Your suggestions may be accepted or not. At any rate, you have a definite article of manufacture to contend with. And it is up to you to devise means and processes by which to accomplish the manufacture as precisely as possible, as economically as possible, in record time. *All of this is planning for production.*

#### Second

**MEANS:** In planning production, we must take into account the producing means by which we dispose of; *space, machines, tools, operators.* We must have ample space, or make it available. We must have it, so nothing may interfere with, or be in the way of, handling thousands of sheets or sheared blanks; their provisioning; their flow from machine to machine, from operation to operation, to assembly; diverse binding; diverse finishing; testing; shop inspection. Machines we can not buy readily. We must use what we have. But we can construct inexpensive machine aids, forming die-sets, binding die-sets, closing die-sets, all operated in the machines at hand.

We may construct jigs for drilling holes after formation; fixtures for holding the parts together in binding, seaming, welding. We may figure out inexpensive, locally constructed tools of the above nature, which tend to make for more accurate and speedier work. The more and the better tools of this kind we can devise or procure, the more precise and economical will be production, assuring us of the product being kept within the specified limits and of getting it out at reduced costs to us.

Now comes the man-power, the operators. We must have at least one good man for laying-out and drafting the parts to specifications and to correspond with the *means* which we employ, with machines and tools. We must have at least one good lay-out man, capable of laying out the blanks as required, as the draftsman calculated them. And then we must have supervisors, capable of getting out the blanks and the parts accurately and speedily through the manifold operations, to assembly, to shop inspection. Oper-

ators must be men trained in rapid processing of the blanks and parts through the machines, the binding means, the assembly.

#### Third

**COST ESTIMATING:** With the above all figured out, we then are ready for the real task of arriving at "what it will cost us to produce the initial 10,000 of the item according to requirements, which also includes an early date of delivery."

First of all we must figure the *cost of preparation* of the shop for this particular production. This includes—removal of other work from the floor; putting machines and tools in order; providing space for material storage and facilities for its movement to the shop and the machines; providing testing and inspection means and facilities and means for moving the product away as quickly as it passes inspection; the cost of prescribed crating or packing; the cost of delivery to destination. This preparatory cost item also must include the preparatory work of engineering, of parts layout, charts, all production aids. Obviously, the cost of the new tools we decided to use must be included, because they are special tools designed for this particular job, and we may not use them again. (On re-orders we may estimate minus the above costs, because we already have the tools and means).

Next, is the cost of all materials needed, delivered. We must figure on the basis of as many blanks as possible from each sheet, with all possible elimination of waste, but we must figure the cost of material by the sheet, not merely by the pound, because there always is some waste, and we must pay for it. In quantity production, material costs amount to over one-half of the total cost and we must figure minutely, not haphazardly. There may be materials which we must obtain ready made—handles, locks, trimmings. The cost of these items must be figured to a fraction of a cent, all costs based on the goods delivered, ready for use.

Production costs are estimated by *operations*: so many hands required to feed the sheets into the shears and cutters, and that many completed blanks are propelled, per minute, to the next operator. Again, so many hands to handle that many blanks, per minute, in the next, and next and next operation. And so many hands to handle that many parts, per minute, in binding, seaming, welding, soldering—as the case may be. And so many hands to move the parts and the assemblies through the final operations, through test and inspection. All supervisors, testers and inspectors are counted as "hands". If these men are working on salaries, the amounts are proportioned to that many tenths of a cent, or that many cents, per this or that operation.

Figuring the true productive costs—the wages paid the operators and then adding an arbitrary or guessed at *overhead* for engineering, adminis-

trative, supervisory, inspection, protective and maintenance expenditures, never will furnish us with the *clear picture* of costs as the other method will. We want, in estimating our true costs on, say, 10,000 boxes, all the costs in a nutshell. By figuring in all the expense of running the shop for the particular purpose of producing the boxes and having a reasonably dependable estimate as to the number of days it takes to produce the boxes, we then can say, with surety: "The 10,000 boxes will cost us exactly 99 cents a box, or a total of \$9,900.00—as the case may be. Knowing the *real cost*, we then add an overhead figured conservatively. And we can add a *profit item* as we may deem conservative enough to meet the figure of the competitor.

#### Fourth

**MAKING READY FOR PRODUCTION:** After we have successfully transacted the business of getting the initial order for, say, ten thousand ammunition containers and have contracted for the materials needed; we now go to work immediately constructing, or have constructed for us, the *means* with which we planned to do the work.

These means should again be calculated and inspected as to their proper use in production and their correctness as designed and specified. And they should be obtained commencing with those needed in the initial operations and progressing to those needed in later operations, until we are completely supplied.

While the above is in preparation, the shop should be cleared of all other work, other materials; the machines should be gone over by competent men, putting them in condition. Shear and brake gauges, templets for checking, all aids facilitating shearing, provisioning, forming, binding, assembly, welding or other means of binding, all these should be made ready for efficient use.

Our engineering and layout men have been, meanwhile, busy drafting, calculating and laying out the several blanks, with provisioning in flat incorporated in them. The blanks (patterns) should be inspected repeatedly (and by another person each time), before they are released for production. Sectional view drafts or sketches may be prepared for use by the supervisors.

#### Fifth

**PROCESS ENGINEERING:** Whereas the above covers getting the plant and the product ready for manufacture, we now enter upon a very important phase of manufacturing, that of *process engineering*. We now have the space, the machines, the tools, the operators, the engineering drafts and shop layouts, everything ready to be put to work and use. But, without proper engineering of the work, there would ensue confusion and untold trouble.

The man entrusted with process engineering has compiled data on space available at each machine or bench, of the feasibility of movement of materials from machine to machine, from operator to operator, of the performance of the machines and the special tools being made ready for use, of operators necessary at each machine or serving material movement, and of the product coming from the last operator to inspection being either moved back to be reworked or adjusted, or forwarded to the shipping room.

The engineer writes out *processing sheets*. He tells the production men which material to use and how to use it; in what manner the materials are to be handled and forwarded; how and at what pace the blanks are to be sheared or otherwise cut, how provisioned, first, next, and next; how moved from operator to operator; how to arrange the new tools on the machines; how to do the machine operations, which first, which next and next; what tools to use in certain work; how many diverse operations to accomplish by a single machine movement; how the material and parts servers shall work; how the operations must be inspected by the supervisors; to what limits the machines and tools adjusted in the various operations; how and at what pace the binding, the welding and such other operations must be made; how best to pre-assemble and do final assembly of parts; how shop inspection must proceed.

#### Sixth

**PRODUCTION SUPERVISORS:** After the process engineer has consulted the men entrusted with supervision and has prepared his processing sheets on the basis of the men's experience with the machines and tools and available operators, the supervisors are bound by the processing sheets, doing their best to guide production by them. True, in complicated constructions for which untried new tools are being used, it is best for the process engineer to have the tools put to work experimentally, checking on their performance and correcting, in time, where corrections are in place. When such experimental work has been used for foundation of processing, the supervisors must use their own efforts making the operators perform right.

#### Seventh

**SHOP INSPECTION:** In National Defense contracting the shop inspection should be rigid enough to pass only units which will stand up under the more consequential, at times capricious, official inspection, which precedes the acceptance of the product by the customer—the Navy yard, the Ordnance Plant or the Quartermaster Corps.

But inspection should not be confined to the finished product. In fact, *each single operation* should be inspected as it is being done, this insuring the fit of the parts, smooth assembly work, the units coming to final inspection correct in every detail.

# Substitute Paint Coatings For Metallic Zinc Coatings

By E. F. Hickson

Department of Commerce, National Bureau of Standards

This bulletin is issued at the request of the Protective and Technical Coatings Section of the Office of Production Management in the interest of conservation. The object is to suggest substitutes that at the time of writing are available to replace critical materials.

**T**HIS article will be confined to the use of organic protective coatings as possible substitutes for metallic zinc coatings.

As is the case with many other materials which are critical during the present National Emergency, no paint has all the desirable properties of the ordinary hot-dip galvanized or zinc-coated surfaces on steel, including such properties as resistance to abrasion, resistance to corrosion, weathering, relative freedom from cracking, chipping, peeling and scaling of the types encountered with paint coatings, etc.. On the other hand, in a highly polluted industrial atmosphere, acid-resisting and water-resisting paints are advantageous.

Thus since the environment and other external factors have such a pronounced effect on the durability of both paint and metallic zinc coatings, only general statements can be made in this memorandum. Frequently painting systems have to be devised so as to cover each individual case. Thus any general procedure or recommendation may not cover a specific situation. It is with this thought in mind that the following suggestions are made.

## Factory-Primed Exterior Sheet Steel Formerly Zinc-Coated (Roofing, Flashings, Etc.)

Since much of the work referred to herein will be done at the shop where the metal is rolled and fabricated, the priming paints to be employed for this purpose should be industrial finishes purchased by the steel manufacturer directly from the industrial finish manufacturer. Special industrial primers for preventing corrosion of black iron have been developed and are readily available. They generally consist of rust-inhibitive pigments such as red lead, white lead, blue lead, metallic lead, zinc oxide, with or without various percentages of chromate pigments, often combined with iron oxide pigments. They are usually ground in quick-drying varnish liquids. The articles are either sprayed or dipped with these primers. While they may air-dry rapidly, they

are usually baked in suitable ovens. Baking for a relatively short period produces a hard, dry surface which may be handled, thus expediting production in the factory. On the other hand, where the objects are to be coated in the field by the user, the slower-drying types of primers, such as red lead in oil and similar rust-inhibitive primers, may be used.

If the sheet steel is painted at the factory, it may be given a chemical treatment followed by a baked-on, high-grade priming paint. Sheet steel coated with vitreous or glass coating is also available. In connection with the chemical surface treatment, reference should be made to BMS Report 44, "Surface Treatment of Steel Prior to Painting," of the National Bureau of Standards. A copy of this report can be obtained from the Superintendent of Documents, Government Printing Office, for 10 cents.

In this report, it was found that among surface treatments for plain steel subjected to accelerated weathering, salt spray, and condensation corrosion tests, the hot-dip phosphate treatments showed outstanding merit in improving the protective value of paints. Particularly effective protection was obtained when such treatments were used under severely corrosive conditions in combination with a primer of the inhibitive type. Two phosphate-chromate cold-wash treatments for plain steel also appeared to improve paint protection.

It is essential that the primer be baked on at proper temperatures and under proper operating conditions. It is also essential that the primer be of high-grade quality and that it be not thinned excessively on the job. As has been mentioned, the primer should contain rust-inhibitive pigments and the vehicle should be of a suitable baking type. Finish coat paints of the desired color may be applied on the job. For example, finish coats of white or light tint paints may be obtained under Federal Specification TT-P-36a, TT-P-156 and TT-P-101a; red and brown iron oxide paints under Federal Specifications TT-P-31a, black paint under Federal Specification

TABLE I  
*Complete Titles of Federal Specifications  
Referred to in Body of the Article*

<i>Fed. Spec. No.</i>		<i>Title</i>
TT-P-20	Paint, Blue-Lead-Base; Basic Sulfate, Linseed Oil, Ready-Mixed.	TT-P-101a Paint; Titanium-Zinc and Titanium-Zinc Lead, Outside, Ready-Mixed, White
TT-P-31a	Paints; Iron Hydroxide and Iron Oxide, Ready-Mixed and Semipaste	TT-P-156 Paint, White Lead Base, Basic Carbonate, Ready - Mixed, Light Tints and White
TT-P-36a	Paints, Lead - Zinc Base, Ready - Mixed, and Semipaste, White and Tinted.	TT-E-506a Enamel; Interior, Gloss, Light Tints and White
TT-P-51a	Paints; Oil, Interior, Eggshell-Flat Finish, Ready-Mixed and Semipaste, Light Tints and White	TT-V-51 Varnish; Asphalt
TT-P-56	Paint (for) Priming Plaster Surfaces (Plaster Primer and Sealer)	SS-A-666 Asphalt; (for) Built-Up Roofing, Waterproofing and Dampproofing
TT-P-61	Paint; Ready-Mixed, and Semipaste, Black	SS-A-701 Asphalt Primer (for) Roofing and Waterproofing
TT-P-86	Paint, Red Lead Base; Linseed-Oil, Ready-Mixed	SS-R-451 Roof Coating; Asphalt, Brushing Consistency
		R-P-381 Pitch; Coal-Tar (for) Mineral-Surfaced Built-Up Roofing, Waterproofing and Dampproofing

TT-P-61; and green paint under Federal Specification TT-P-71a. See Table I.

**Painting Exterior Sheet Metal on the Job Formerly Zinc-Coated (Roofing, Flashings, Window and Louver Heads, Etc.)**

The problem here is to have a sheet that must stand exposure to ordinary storage, handling and fabrication, and then be able to be welded or soldered and subsequently painted. One Government Agency specifies that for exterior sheet metal work for roof flashings and flashing at door, window and louver heads the materials shall be either phosphate-treated steel or terne plate. It also specifies that the surfaces that are to be painted shall be thoroughly cleaned and all traces of flux removed. The steel shall be 26 gauge, phosphate-treated, and given immediately a dip-coat of mineral oxide paint baked on at a temperature of 250 to 300 degrees F. Both sides of phosphate-treated steel and all exposed surfaces of other sheet metal work, flashings, etc. (except cooper), shall be painted with one coat of red lead and oil paint before placing. The red lead paint shall comply with Federal Specification TT-P-86.

**Painting Interior Sheet Steel Formerly Zinc-Coated (Air Ducts, Etc.)**

The same recommendations of pretreating the steel prior to applying a baked-on, high-grade, rust-inhibitive primer may be followed. However, for certain places where the surface is not to be exposed to the weather, the application of a bituminous base coating (Fed. Spec. SS-R-451) may serve the purpose. However, it should be required that this coating dry hard and free of tackiness. In the case of air ducts that become

hot, it is suggested that instead of the above-described bituminous base coating, the ducts be dipped in asphalt varnish (Fed. Spec. TT-V-51). This will produce a coating that will bake on the surface at a temperature of 300° to 400° F. Special heat-resisting enamels in black and gray colors are also available. These enamels will withstand temperatures considerably above 400° F.

**Painting Exterior Structural Steel (Angles, Channels, Etc.) Formerly Zinc-Coated**

After priming the clean surface with a rust-resisting primer such as red lead paint (Fed. Spec. TT-P-86), basic lead chromate paint (Fed. Spec. TT-P-59), blue lead paint (Fed. Spec. TT-P-20), etc., use a finish coat of gray paint or any other tint conforming to Federal Specification TT-P-36a or TT-P-156. If chalk-resistant titanium oxide is specified, Federal Specification TT-P-101a, or War Department Cantonment Paint. Standard Specification 8000 E, may also be used, tinted gray or any other desired color. If color is of no moment, dark-colored paints such as iron oxide (Fed. Spec. TT-P-31) or black (Fed. Spec. TT-P-61) will be more durable than white or light tint paints. Additional information on painting structural steel may be found in the National Bureau of Standards Letter Circular 422, "The Painting of Structural Metal."

**Painting Interior Structural Steel Formerly Zinc-Coated**

In industrial plants where good light reflection from the structural steel is desired, the following procedure may be used. Apply a priming coat of quick-drying red lead paint (Procurement Division Specification No. 358), or a similar rust-inhibitive primer, followed by either two coats of

eggshell flat white paint (Fed. Spec. TT-P-51a) or gloss white enamel, sometimes called "gloss mill white," (Fed. Spec. TT-E-506a). The enamel will be more water-resistant and more durable. For special conditions where fumes are encountered, such as in chemical laboratories, bakeries, tobacco factories, cafeterias, etc., a special enamel known as fume-and-heat-resisting enamel (National Bureau of Standards Letter Circular 489) may be used.

#### Painted Wire Formerly Zinc-Coated

The problem here is to suggest a paint that will be acceptable substitute for galvanized wire screen (one-inch mesh) used in reinforcing stucco in home construction. Probably the best method would be to have the work done at the finishing plant, where the black iron screen could be passed through a tank of black, flexible enamel or japan, and then baked in suitable drying ovens prior to shipping the screen in rolls. This coating would be tough and flexible and would not chip off. The necessity of having some kind of a coating on the black iron is to prevent rust stains from "bleeding" through the stucco and paint after the building is erected. A cheaper but not as durable a method is to dip the roll of black iron screen being used on the job in a tank of a bituminous solution of proper composition. This material would dry quickly, and since the amount of bituminous coating on any one wire would be relatively small, it is doubtful whether there would be any trouble from the bitumen "bleeding" through the stucco. Another possibility is to dip the roll in a quick-drying, thin spar varnish.

#### General Considerations

As can be seen from the foregoing remarks, it is possible to use Federal Specification materials or their equivalents as substitutes for zinc-coated surfaces under a variety of conditions. Recommending the use of synthetic resin paints and

enamels has been avoided, because of the shortage of certain ingredients used in these paints. The same statement holds true for aluminum paint. Similarly, certain highly durable cellulosic finishes could be employed, but an acute shortage of the plasticizers and solvents for these is also developing.

As has been noted previously, the condition to which the surface is exposed has a direct influence on the durability of the paint coating. Thus a coating that may show excellent resistance under water (for example a bituminous coating) may fall rather quickly when exposed to the weather.

In using paint to replace galvanized or zinc coatings, it should be kept in mind that the condition of the surface is of utmost importance. It should be clean, dry and free of all rust and scale prior to painting. Within practical limits, the protective value of a paint film is roughly proportional to its thickness. Thus for exterior exposure the safest procedure is to apply three coats of good paint, each coat being spread at a practical spreading rate (500 to 700 square feet per gallon). Where exposure conditions are particularly severe (for example an outside roof), it is suggested that two coats of primer and two coats of the finish paint be applied.

Equally important as the character of the surface and the thickness of paint film on the ultimate durability is the method of application. There is no substitute for skill in application. This is at least as important as the quality of the paint. It is for these reasons that the only proper method of evaluating a paint job is on the basis of coat of paint per square foot area applied per year of service.

Wherever Federal Specifications are referred to in this memorandum, they cover products which will be satisfactory for the use referred to, but for the general buying public similar products may be obtained under trade brands at any paint store throughout the country. The paint dealer will readily recognize the material referred to.

## Insulation Makes A Furnace "Bigger"

NATIONAL MINERAL WOOL ASSOCIATION suggests that in connection with the Federal Housing Authority plan to "Repair for Defense and Remodel for Roomers in Defense Areas" such remodeling should be made with full knowledge that tenants have to be satisfied and sufficient rentals must be charged to amortize the cost of remodeling. Of primary importance is the fact that tenants make greater demands for comfort than the owners of the old houses have been satisfied with.

1. The old houses which are converted into apartments or for roomers must be considered from the standpoint of their new use—there is no opportunity for the tenants to wander into the cooler lower portions of the house in the hot daytime. They are confined to remodeled quarters likely to be on the upper floor; and much rental loss will take place if tenants

are uncomfortable. A home owner may put up with many discomforts that a tenant will not put up with. Now that the house becomes "income property" every device must be used to keep the tenant comfortable in his confined quarters. This generally requires full-thick insulation above the top floor ceiling.

2. Heating will, in many cases, be a problem of a larger furnace or insulation of walls and/or ceilings in order to make comfortable living quarters out of rooms heretofore used as bedrooms and probably low in heat supply. It is customary to put less heat into bedrooms than into living rooms. It must be remembered that such rooms now become living rooms as well as bedrooms and the tenant will demand reasonable comfort. If the present heating plant is on the edge of being sufficient, there will be no need of installing a new plant if the walls and ceilings are insulated.

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they're not fully threaded to the head — screws that "pop off" at the head when drawn up tight.

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*Quality Controlled*  
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Left to right—William Lenihan reports the group insurance program has made excellent progress with a low loss record. President Henry Steinhorst presiding. H. A. Daniel says contractors can make more real profit from a wise insurance choice than from some other activities.



## New York State Convention

**N**EW YORK State Sheet Metal, Roofing and Air Conditioning Contractors' Association offered as their feature attraction at the 19th annual convention, March 17, 18 and 19, in Utica, a one-day warm air heating short course designed primarily to present better engineering methods applicable to the current small house heating program.

The instructor was Prof. Lorin G. Miller, head of the Department of Mechanical Engineering, Michigan State College, East Lansing, Michigan. Prof. Miller selected for the discussion a typical one-story with basement small house plan in which a forced warm air, trunk-line heating installation was designed, using the standard heat-loss and data sheet suggested for use with the Technical Code. Students calculated the heat losses, sized the ducts, selected the fan and blower required, for a complete installation in a 50,000 Btu heat loss structure.

No attempt was made to calculate heat losses or size the system by short-cut methods; instead, a full Technical Code system was designed, but in the discussion, certain short-cut methods were presented and discussed as possible time savers for these very small houses. For those students who have never used the Technical Code, this short course was especially interesting as it enabled the students to take home a completely engineered system for comparison with their customary methods. For those students accustomed to the Technical Code, the short course served as a refresher with an opportunity to discuss any uncertain points in the method.

### OFFICERS—1942

President ..... Henry Steinhorst, Utica  
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Joseph Stiglmeier, Buffalo.....Term expires 1944  
Burton Stevens, Rochester .....Term expires 1944  
H. A. Daniel, Newburgh.....Term expires 1945  
Clarence Williams, Rochester.....Term expires 1945

### Group Insurance Progress

As reported in AMERICAN ARTISAN last year and the year previous, the New York State Association insurance group has now had one full year of operation and the progress was reported by William Lenihan of Laverack and Haines, Inc., Group Managers. According to Mr. Lenihan, the association now has 46 members in the group and by the end of 1942, it is confidently expected that a total annual premium of \$50,000 will be represented in the group insurance plan.

The loss experience of the group during the first six months of operation was between 12½ to 20 percent. It is expected that the loss ratio during coming months will not exceed 20 percent, which will permit an additional 20 percent of the premiums to be allocated to a contingent fund. This will permit the group to operate with \$20,000 in losses; \$10,000 in expenses and overhead; \$10,000 as dividends; and \$10,000 to the contingent fund.

It was explained for the benefit of contractors not members of the group that the premiums have been 15 percent lower than mutual company rates, but 10 percent of this 15 percent saving is taken by the service company in payment for fees, leaving a 6½ percent net saving under the mutual rate. The contingent fund mentioned, will be built up year by year until the fund equals 60 to 85 percent of the annual premium and then the contingent fund will remain stable as an extra policy to cover liabilities in deaths, etc. Mr. Lenihan also explained that under the group plan premiums remain stationary and there are no assessments even though the losses exceed the premiums.

### Group Insurance Profitable

H. A. Daniel of Newburgh, advocating the group plan and inviting additional contractors to participate, said in his experience if contractors will pay as much attention to insurance rates, premiums, returns and plan details as they pay to new products, it is quite possible for a contractor to make more net profit through his insurance operations than it is through buying and selling new products. Furthermore, said Mr. Daniel, there seems to be some likelihood that mutual and private companies may find their incomes curtailed so that dividends may be decreased or eliminated and assessments may be called for. If losses remain stable and the contingent fund builds up contractors in the group plan may find eventually they are buying

their insurance at approximately one-half the cost of insurance in a mutual or private company.

Mr. Daniel also asked those contractors who insist on remaining in mutual or private companies because of the business turned over to them by insurance company representatives that they carefully calculated the profits from such business to be sure that profit is actually what they think it is and expectations of securing more business than they actually get.

#### Built Up Roofing Repairs

A discussion of built-up roofing repairs was presented by V. R. DeWald of the Johns-Manville company. The speaker suggested that roof repairs is a specialized business and the roof repair job should start with a careful check of the condition of the roof to determine whether local repairs or a general roof repair plan is required. Where a full repair is indicated, the contractor must decide whether he can rescreen the slag, or whether the old slag is so dirty it must be thrown away. The inspection should check the condition of the underlying felt to be sure that it is dry. If the felt is wet, it should be allowed to remain uncovered long enough to completely dry. This may take several days.

One type of roof subject to cracking is the precast slab which has cracks in the surface; the best repair is to cut a strip of felt in half and fold three times and lay the fold over the exposed crack and then cover the folded strip with the other half of the strip in cement or asphalt well mopped over. Loose edges around the crack not repaired in this manner should be raised and the edge fastened down with a good grade of cement.

The best repair for blisters is to perforate the felt and stamp the felt down tight against the roof and remop or cement. Where the blister is very large, it probably is best to cut the blister out and patch. Where drains projecting through the roof leak, it frequently is advisable to completely remove the old drain and replace with the type of drain having a large flange. The flange should be set in plastic. Some types of vents should be flashed by carrying the flashing completely up around the sides and over the edge into the inside of the vent pipe.

Another frequent source of roof leaks are parapet walls where the wall itself is poorly constructed, allowing water to enter the wall, and pass behind the flashing into the building. Sometimes it is advisable to insert a flashing completely through the wall about 12 inches above the deck so that the upper wall may dry out and the lower wall be capped. If the flashing is metal, inspection should show whether the flashing is completely grouted into the wall and should, if possible, enter the wall at least the thickness of one brick course.

Precut shingles used on a sloping roof should always have felt laid over the sheathing as a base for the shingle; where this is neglected and it is impracticable to remove the shingles, sometimes repairs can be made by sealing the underside of the sheathing boards with felt properly cemented to the sheathing.

#### Priorities

Joseph T. Kelly, Jr., of the Office of Heating and Plumbing Division, War Production Board, Washington, speaking on priorities, reported that there are now 24 industry branches in War Production Board and eventually there will be one branch for each major industry.

Each industry branch, in turn, has several divisions—for example in the plumbing and heating division, there is a branch for manufacturers, a priorities branch, a conversion branch, a simplification branch, etc. Orders which affect our industry may originate in any one of the several divisions of a branch, but having been originated, all divisions of each branch must then carefully consider the proposed order and the suggestions of all the divisions must be correlated before the order is finally issued. Also, prior to the issuance of an order, the advisory committee of the industry affected is usually consulted on the general effect of the order on the particular industry.

Mr. Kelly announced that order P-84, a maintenance and repair order has been issued in Washington. Mr. Kelly discussed this order but a complete publication of the order is included in this issue of AMERICAN ARTISAN. Exhausted jobber stocks which prevent the jobber from selling all of the small orders which do not actually need a priority number because of their very small size, should be alleviated by P-84 which will enable jobbers to maintain stocks sufficient to fill small orders of less than \$10 each.

Washington still insists, according to Mr. Kelly, that the repair and maintenance order means literally what it says: Piece for piece, and does not include any betterment to the existing system or equipment. New light-weight furnaces replacing old very heavy furnaces is quite satisfactory as a point of argument, but the furnace industry simply does not have the material required to produce new furnaces even though the weight is considerably less than older furnaces which might be replaced. Also, said Mr. Kelly, the argument that this method of replacement would gather in large quantities of scrap is another good point for argument, but falls down practically because there must be an interim of six to eight months between the time the old furnace is scrapped before the scrap actually reaches the steel mill furnaces.

In the discussion period which followed, Mr. Kelly answered the question of why does WPB issue A-10



Some convention speakers. Left to right—W. W. Graham (American Rolling Mill) advised contractors to investigate war product sub-contracting. V. R. DeWald (Johns-Manville) gave a blackboard talk on roof leaks and repairs. Joseph T. Kelly (War Production Board) announced P-84, the new small stocks order. Professor Lorin G. Miller (Michigan State College) ran a one day—three session—short course on forced warm air heating for small houses—must have been just what was needed because everybody attended all sessions.



Impromptu photographs of New York conventioners at play—a buffet supper and a banquet, with a floor show, good food and lots of fun.

priority ratings when A-10 does not get the materials such as galvanized iron in many areas. Mr. Kelly replied that A-10 does get galvanized iron in many areas and where it does not secure material, it is always possible for the applier to appeal and secure a rating high enough to obtain the material.

Mr. Kelly also announced that the jobbers' inventory control order M-67 will soon be replaced by a new order PB-1x which presumably will grant sufficiently high priority rating to obtain material for jobbers' required stocks.

#### Steel Mills' Predicament

W. W. Graham of American Rolling Mill Co., speaking on the effect of war production on the sheet metal contractor, said that prior to December 7, many factions in the steel industry were highly critical of Washington, but that since December 7, the steel industry to a man has agreed to abide by Washington's requests and regulations. At the present time, many mills are unable to supply material on any orders under an A-1j rating, but the mills hope that the new order P-84 and PD-1x will enable the mills to give the jobbers and the contractors some measure of relief. So far as alloy strip is concerned, nothing under an A-1-c rating will obtain material at present, said Mr. Graham.

As to what the sheet metal contractor may expect, Mr. Graham suggested that every contractor must anticipate radical changes in his methods of doing business. Why sheet metal contractors are unable to obtain light gauges of black and galvanized metal was explained by the speaker, who said that many of the sheet mills have now been converted to roll  $\frac{5}{8}$ -inch plate and, in addition, most of the mills never before produced one-half of the products which they are now asked to manufacture.

Also the sheet metal contractor may expect from the defense housing program an opportunity to do a large volume of work in certain defense areas where many new houses and modernization of old houses must be carried on during 1942 if workers in war in-

dustries are to be adequately housed. Mr. Graham also suggested that sub-contracting on war products also offers a splendid opportunity for power equipped shops to obtain large orders of required equipment or material. The problem of the small shop is ticklish because many of these small shops have inadequate tool or machinery set-up, they do not have sufficient personnel, and orders as let today are too large for a single small shop. The only alternative is for such small shops to pool their resources under some sort of a pooling plan, said Mr. Graham.

#### Association Business

The association, as a group, through its resolutions committee, went on record in favor of permitting any individual, regardless of union affiliation, to be employed in defense industry work. Also that because heating is essential to comfort, allocation of required material should be made by the proper agencies in Washington to permit the warm air heating industry to manufacture and install equipment necessary to maintain civilian comfort and health.

Clarence Meyer, submitting his Secretary's report, announced that 17 firms forming the Westchester, New York, Heating Association, had applied for membership in the New York association as a group. The association voted to accept the Westchester group as members. Secretary Meyer also reported that association finances for the year 1941 are in excellent shape with a substantial surplus in the bank and with some additional members taken in during the year. The secretary's report seemed to reflect the opinion of the association that the heating industry should be considered essential and all efforts made to permit the heating industry to function as nearly normal as possible without trying to make normal operation as difficult as possible through orders, restrictions, material lists, etc.

In view of the excellent work by officers and committees during 1941, the association voted unanimously to continue the same officers and directors in office.



Michigan, for years, has been an all-men affair. That the men of Michigan do turn out for their convention and that they do have a good time is evident from these casual banquet photographs. At top—Some of the officers and speakers.

## Michigan's Convention Reflects War Problems

MICHIGAN'S Thirty-first annual convention, held March 3rd, 4th and 5th in Detroit, graphically reflected the effect of the war on the warm air heating and sheet metal contracting industries. Highlighting the program, were addresses on heating by Professor S. Konzo of the University of Illinois and a discussion of priorities by James E. Wilson, manager of the Michigan Office, War Production Board, and T. I. Easton, assistant to Mr. Wilson.

### Konzo-Cantonment Heating Problems

Briefly reporting on his survey of cantonment heating systems, Prof. Konzo said this survey indicated that the forced warm air heating equipment installed in barracks is highly satisfactory from an equipment and comfort standpoint, but difficulties have arisen through improper and poorly devised supervision and operation of the firing schedules. The chief difficulty has arisen because firing the furnaces has been fatigue duty and many of the soldiers have never had any experience with warm air heating. As a result, coal has been piled into the furnaces as specified and ashes have not been removed; control systems have been made inoperative through negligence or misunderstanding of the functions; and complete automatic control has been nullified by improper operation of the control systems.

A solution is under consideration wherein a civilian supervisor will be appointed over a certain number of furnaces (probably fifty furnaces) and then one supervisor will be appointed for the camp as a whole. These supervisors will be provided with firing check sheets for each furnace for each day, each week and each month so a complete analysis can be made of the firing operation of each furnace.

Prof. Konzo then discussed in detail the expected results from the newly announced defense housing critical list. This new critical list was published in detail (so far as heating specifications are concerned) in the March issue of AMERICAN ARTISAN. Briefly, this

new critical list, which is indirectly a code because it restricts certain materials and specifies how substitutes and materials shall be used, sets a maximum heat loss of the house equal to 66 times the net floor area or 80,000 Btu, whichever is the smallest. Houses exceeding 80,000 Btu heat loss are expected to be insulated down to the 80,000 Btu maximum.

Sixty days after the Critical List goes into effect, furnaces shall be rated as specified in the critical list. A very important detail, pointed out Prof. Konzo, is that each furnace can be rated at a given firing rate. Therefore, if a given furnace has a 90,000 Btu capacity at 7½ pounds of coal per hour per square foot of grate area, the manufacturer may specify an 80,000 Btu per hour capacity at 6½ or 7 pounds per hour per square foot of grate area firing rate.

In the same manner, an oil furnace rated at a given capacity at 1 gallon per hour can be given a lower rating when the oil-firing rate is three-quarters of a gallon per hour. This, pointed out Prof. Konzo, can result in confusion, but it does make possible the use of larger than necessary furnaces providing the firing rate is specified.

### Influence of Materials Critical List

Pipeless, gravity, and forced warm air furnaces are all provided with a method of rating in the critical materials list. This method of rating is plainly set forth in the critical materials list, as published in the March AMERICAN ARTISAN. The interesting thing about this method of rating, said Prof. Konzo, is that certain furnaces will be rated at a lower capacity than at present. The contractor need not be afraid of these ratings, said Konzo, because the National Warm Air Heating and Air Conditioning Association and the research residence staff has co-operated with Washington agencies to make these ratings completely satisfactory to the industry.

Some details of the critical list which will undoubtedly greatly influence 1942 installation practices were

cited as—the use of black iron in place of galvanized iron; galvanized iron may be available only for fittings and concealed ducts with all other parts of the duct system black iron or substitute; the prohibition of double-walled stack and fittings in all cases; no metal whatever for returns beyond six feet from the furnace; no iron heavier than 26-ga.; registers and grills of the plainest possible type and without any metallic plating; all oil tanks of a size and construction and a price as specified in the critical materials list and as ceilinged by Office of Price Administration newly announced oil tank price schedule (see AMERICAN ARTISAN for March).

Prof. Konzo then explained how suitably the new gravity heating manual fits in with the limitations of the critical materials list and with the various codes which are recognized by Washington. For example, Table 1 on heat losses makes it possible for the contractor to select his outside design temperature and then from the table to select the heat loss factor without considering temperatures in attics or temperatures in the ground or temperatures in the basement. Table 5 of the manual also makes it possible for the contractor to select the register size, register box, stack, branch, and main sizes directly and in sequence from the table without calculation.

#### Priorities and Orders

The second important address and discussion of the convention was presented by James E. Wilson, manager of the Michigan Office War Production Board, Priorities Field Service, and Mr. T. I. Easton of the same office. Opening the discussion, Mr. Wilson pointed out that whether we stay in business and how we stay in business is the problem of every contractor during the emergency. The situation has now reached the place where violations of existing limitations and orders only mean trouble for the violator. Recently announced regulations make it possible for War Production Board to commandeer any stocks of materials which are being hoarded or kept out of circulation.

Mr. Wilson emphasized that rumors that small business is to be regulated out of the American economy are without foundation—only a small percentage of small business will be killed and in the main these small businesses will be those which do not fit into the present emergency program or which refuse to cooperate during the emergency. Mr. Wilson asked every man in business to make sure there is nothing

he can do before he lays off men or closes up his shop, and so far as the contracting or fabricating business is concerned the present exhibits of subcontract distribution offices will undoubtedly show a product which the sheet metal fabricator can manufacture provided he exercises a little salesmanship and a great deal of ingenuity.

During the duration of the emergency, certain emergency regulations must be placed in effect and while industry may not agree that these regulations are absolutely essential, each industry must abide by these regulations. For example, the warm air heating industry may not agree that an existing gravity furnace shall be left in place when a conversion to a modern type forced warm air unit will save fuel, but because of material shortages it is necessary that existing furnaces be repaired and maintained and not bettered. This order means literally what it specifies—a grate bar for a grate bar; a fire pot section for a fire pot section; a smoke pipe section for a smoke pipe section; and the order does not include conversion from existing coal to oil or gas or installation of a modern type system for a gravity furnace which can be operated satisfactorily.

T. I. Easton, assistant to Mr. Wilson, discussed the various orders which affect the warm air heating and sheet metal contracting industries. The discussion of these orders as presented by Mr. Easton and Mr. Wilson is covered in a separate article in this issue.

#### Priority Questions and Answers

A written question period followed Mr. Easton's discussion. Some of these questions are so pertinent to conditions that we reproduce the questions and the answers.

1—If the contractor has material on hand and cut and partly fabricated, can he use that material? *Answer:* Such material can be used.

2—Is any priority assistance available for house construction in non-defense areas. *Answer:* No priority assistance is available at present for house construction in localities which are not in a defense area.

3—FHA inspectors refuse to approve control systems which are not in complete agreement with local codes. What can be done? *Answer:* Every effort is being made to have local inspectors approve emergency control systems which are necessary under the emergency, even though this means emergency changes in the local code.

4—Can a contractor originate a P-100 order for



Just a minute—Most of these "girls" are men—a special show by a troupe of professional "girl" imitators. One of the "girls" above is a girl—which one?



President-elect Elmer Schar-tow reports on the proposed heating contractors' emblem while President Sherk and Secretary Spraker listen. Right—G. R. Hendricks reports association cooperation saved him some \$1700 in extra sales tax.

maintenance or repair? *Answer:* The contractor can not originate a P-100 order. The owner must originate the P-100 order. Of course, the contractor can obtain the necessary P-100 form and fill it in for the home owner, and tell the home owner how to put the P-100 order into proper operation, but the application must be signed by the owner or lessee.

5—Can a firm doing both contracting and sub-contract manufacturing file under PD-25A or PD-25X to obtain materials? *Answer:* War Production Board defines a manufacturer as anyone who takes raw material and fabricates a finished product. Therefore, a combination operation can qualify under PD-25A or PD-25X for that part of their business which is manufacturing under subcontract orders. It is probable that the contracting part of such a business can also file, but a definite ruling on this has not been made as yet.

6—What are the chances for a blanket oil-furnace order and is there any shortage of fuel oil? *Answer:* Fuel oil stocks are very high and getting higher; there is more fuel oil than the country can use; the difficulty arises from a lack of fuel oil transportation; therefore, a fuel oil restricting order may be anticipated.

7—A firm has a certain stock of stainless steel on hand and this stock is frozen, what relief can be obtained? *Answer:* The owner of such a stock of stainless steel should apply to the local War Production Office for relief. Certain forms and procedures are available to release this material either for sale back to the supplier or for fabricating purposes.

8—In case of a breakdown in a defense plant, how can repair and maintenance materials and equipment be obtained? *Answer:* The owner or operator of the plant can apply for material and equipment under a P-100 order which automatically obtains an A-10 rating. However, the P-100 order can not be used for replacement of capital equipment, but can be used only for broken parts. If an A-10 rating is not high enough to obtain materials or equipment, then application should be made on a PD-1A which is the catchall regulation.

9—Certain operators and jobbers maintain heavy inventories during certain periods of the year and very

light inventories during the remainder of the year. Can seasonal stocks be obtained? *Answer:* Generally speaking, application on a PD-1A order will obtain material for seasonal inventories. The question is a bothersome one and complete rulings on seasonal inventories are expected.

#### N. W. A. H. & A. C. Ass'n Report

George Boeddener, Managing Director of the National Warm Air Heating and Air Conditioning Association announced that the Association is contemplating a co-operative effort with the National Homes Foundation whereby the two associations will distribute fundamental house plans meeting the present emergency conditions, and in the case of our warm air association, complete sets of suggested heating plans will be included with the house plans. Mr. Boeddener suggested that such plans and such a service might be distributed through jobbers and dealers to architects, prospective owners and builders who are looking for suitable house and heating plans. Mr. Boeddener asked for an expression of opinion on this matter, but the consensus of opinion seemed to be that this would require considerable study and the convention was not in the position to offer advice.

A very important phase of our industry's operations during 1942 must be an all-out effort to conserve materials in order that our industry may prove to Washington that we are anxious to conserve critical materials and thus offset tendencies in certain offices in Washington to specify floor furnaces and circulating heaters because such heating plants require less critical materials. Only in so far as our industry can demonstrate a willingness to conserve materials can this tendency be offset.

#### Roofing Session

As customary, one session was held for the roofers and another session for the warm air heating contractors. Of interest to the roofers was the Ruberoid Company moving picture in technicolor on manufacture and use of roofing material. The roofing contrac-

(Continued on Page 100)

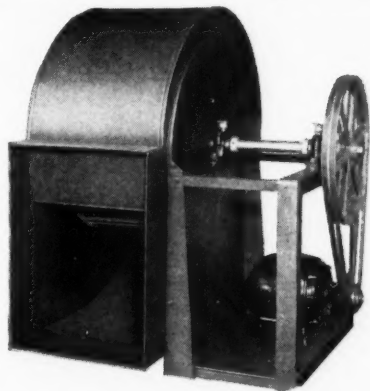
Left to right—C. B. Branch brought a plastics exhibit to show the many products now made of plastics. Professor Konzo called attention to the implications and regulations of the new Critical Materials List. George Boeddener, Managing Director, N.W.A.H. & A.C. Ass'n suggested standard heating plans to accompany standard FHA house plans.



# New PRODUCTS

## 39—Blower Line

The Peerless Electric Company, Warren, Ohio, announces a new line of blowers for ventilating, heating

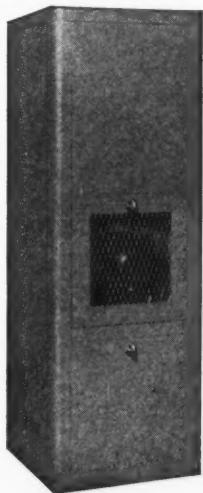


and air conditioning. There are 26 sizes in the belt-drive type and 12 in the direct connected type.

New folders SDA91 and SDA92 illustrate and price these blowers.

## 40—Defense Unit

The Waterman-Waterbury Company, 1121 Jackson St., Northeast, Minneapolis, has added model VHB-4312-10, a HiBoy model equipped with vaporizing type oil burner and with



a forced draft fan to supply air to the oil burner.

This unit is furnished complete with blower, combination fan and limit control, thermostat and automatic 2-stage pilot and high fire control.

The heat exchanger construction is such as to guarantee a high efficiency of combustion, and the casing construction is simple and provides ready access to any part of the unit at any time.

This neat unit with burner and controls, entirely enclosed, occupies a space only 26 in. square.

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 89 and mail to us.

● Indicates product not listed in 1941 Directory.

△ Indicates manufacturer not listed in 1941 Directory.

## 41—Tempered-Aire Unit

The Air Conditioning Division of Gar Wood Industries, Inc., 7924 Riopelle St., Detroit, has introduced a new Tempered-Aire heating unit designated as Model "Seventy-Five."

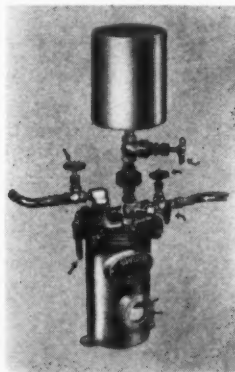
The new Gar Wood Model "Seventy-Five" is a wartime product, stripped down to essentials, was designed for installation in small dwellings and defense-type homes and sells at a new, low price. The capacity is 75,000 Btu per hour at the bonnet. The air delivery is 750 Cfm at 160°. Model "Seventy-Five" is ample for a house with a heat loss of 60,000 Btu per hour and comes within the Government's limitation of 26 x 26 in. plus allowance for burner enclosure.

In the Model Seventy-Five the fire-box and fire bowl have been combined into a single assembly. The economizer contains four tubes arranged in pairs at each side in order to make room for a six-inch flue pipe in the middle. This pipe conducts the gas from the breeching at the front so as to give a rear stack connection. It provides a third pass to the gas travel and raises the air velocity over the tubes by reducing the free area.

## 42—Gasfluxer

Automatic Gasflux Mfg. Co., 198 Wayne St., Mansfield, Ohio, offers the Model R-E Glafluxer assembly, approved by the Underwriter's Laboratories, Inc., and by the Associated Factory Mutual Fire Insurance Companies.

In operation the Gasfluxer is filled with Gasflux to the top of the sight

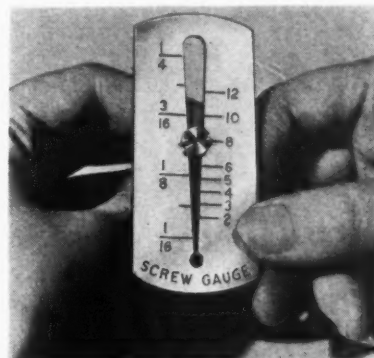


glass and is connected into the fuel gas line leading to the welding torch with a short piece of hose. After turning on the gas and opening the torch valve to purge the Gasfluxer of air, the flux regulating valve can be adjusted to provide the proper amount of flux. The fuel gas passing

through the Gasfluxer picks up the flux in vapor form and delivers it to the torch in the gas—the flux is in the flame. Presence of Gasflux is determined by the green color of the flame. In the new automatic gasflux process, the liquid Gasflux is inducted directly into the gas line and is discharged through the top of the torch with the flame.

## 43—Standard Screw Gauge

The Dayton Rogers Manufacturing Company, 2830 Thirteenth Avenue South, Minneapolis, is offering for free distribution a handy American National Standard screw gauge for calibrating both wood and machine screws, in sizes from No. 1 to 12 in.



clusive. This recording caliper gauge has two sets of graduations. The one on the left of the angular slot records the number or size of wood and machine screws, while the graduations on the right record the diameter size of various round stock from  $\frac{1}{16}$  in. to  $\frac{1}{4}$  in. While the gauge is graduated in  $\frac{1}{16}$  in., a  $\frac{1}{32}$  in. graduation is very easily estimated.

The gauges are accurately made from .165 in. thick good quality flat steel die cut to size and are finished to prevent rusting. The over-all gauge is approximately 3 in. long by 1 $\frac{1}{2}$  in. wide. This handy combination screw gauge and recording caliper is free on request on your company's letterhead.

## 44—Feather-Weight Torch

Weldit Acetylene Co., 643 Bagley Ave., Detroit, announces a new



feather-weight torch—weight 9 oz., length 11 $\frac{1}{2}$  inches—suitable for aircraft and sheet metal welding.

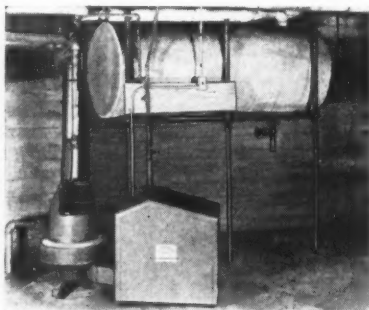
# New Products . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 89.

## ● 45—Stoker-Water Heater

Gehl Bros. Manufacturing Co., West Bend, Wisconsin, is introducing a new stoker-fired water heater, designed for hot water supply for apartments, hotels, office buildings, etc., also as a heating unit where requirements are not great, such as small homes or filling stations.

The stoker is a miniature of the regular Gehl domestic models and has all their features, except for a difference in the coal and air feed tubes. It has the same transmission, including shear pin protection and



throw-out lever, also the double pulley arrangement, which provides for two different rates of coal feed. The regular Gehl Air Governor is used. The air chamber is designed also to act as a base to carry the boiler, and is fitted with leg adjustments to compensate for the unevenness of the floor.

The heater is a complete unit in itself. It can be set in place, connected to the hot water storage tank, and in most places, plugged into an ordinary outlet. There are two sizes.

## ● 46—Weld-Sequence Timer

Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., announces a new weld and sequence timer for use in automatic resistance spot, butt or projection welding.

Housed in a steel wall mounted enclosure of black crinkled finish, the unit is 17¼ inches high, 12 inches wide, and 12 inches deep. Approximate shipping weight is 60 pounds. On a dead front panel, also of steel, are mounted the individual timing circuit, adjusting potentiometer knobs and dials, repeat and non-repeat switches, and the tubes.

The control transformer is wound for 115/230/460/515 volts, 50/60 cycles. The solenoid relay is rated 25 amperes at 110 or 220 volts and 10 amperes at 440 or 550 volts. Standard foot switch control voltage is 115

volts except when 24-volt circuit operation is specified.

The timing circuit is fully electronic and consists essentially of a resistor capacitor circuit whose charging rate is adjustable by varying a resistor. The voltage of the circuit is applied to the grid of a thyatron tube so that after a predetermining charging time has elapsed the thyatron is energized and operates the relay.

The timer divides the total time of a weld into the various intervals in which the welder goes through its operating sequence and includes a "weld" period of 3 to 30 cycles when the full welding current flows. When welding thick plates, brass, or stainless steel, timing facilitates permit intermittent heating and cooling steps of from 3 to 30 cycles.

## 47—G-E Oil Vaporizer

General Electric Company, Air Conditioning and Commercial Refrigeration Dept., 5 Lawrence St., Bloomfield, N. J., announces two new low-cost furnaces designed to meet the needs of war housing applications. Both are warm air furnaces of the oil vaporizing type, and both are shipped factory wired and assembled ready for installation.



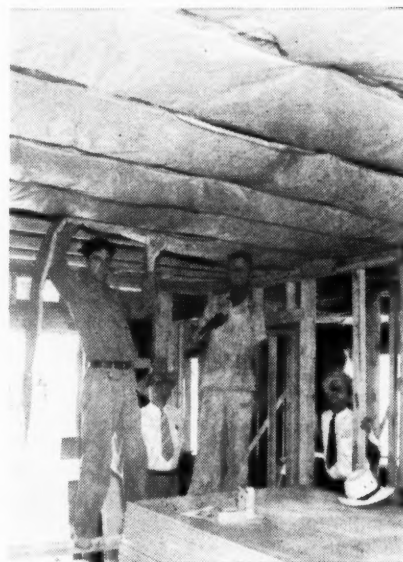
The new furnaces are 20 x 22 by 66 inches high and are designed to obtain low outside jacket temperatures. The smaller unit has a bonnet output of 53,000 Btu per hour and a bonnet air flow of 530 cfm and weighs 160 pounds. It is equipped with a centrifugal fan, but no filters are supplied.

A mechanical draft fan is standard equipment on both models. The units come complete with oil control valve, fan control, limit switch, draft regulator, and single range thermostat. The oil rates are .10 gallons per hour minimum and .61 gallons per hour maximum. Both units have been approved by Underwriters' Laboratories, Inc., and comply with commercial standards CS 75-39.

## 48—Defense Blanket

Wood Conversion Company, First National Bank Bldg., St. Paul, Minnesota, announces a new insulating blanket especially developed for defense construction.

Defense Blanket like Balsam-Wool



is a completely sealed insulation covered by a waterproof paper on both sides and is flanged on the edges for quick, permanent application. It is available in rolls or may be cut in varying lengths to fit job requirements.

Defense Blanket is light in weight and low cost. The flange is spot stapled in position, then lath is applied holding the flange to the joist.

## △ 49—Tenite Seamless Tubing

Extruded Plastics, Inc., Norwalk, Conn., offers transparent Tenite tubing in sizes ranging from ⅜ to ¾-inch in diameter—a seamless tubing extruded in continuous lengths.

This new tubing is virtually unbreakable and may be readily bent, formed or curved to fit almost any condition, according to the manufacturer. The ends may be easily adjusted to standard flared fittings with the same tools that are used for copper tubing.

Large diameter tubing, with a wall thickness of 0.0625 in., can be threaded with standard thread cutting tools. Tubing in sizes up to ½-inch diameter, with a wall thickness of 0.035 in., is stocked in long lengths coils. Tubing over ½-inch diameter, is stocked in 12-foot lengths. One-inch diameter tubing is expected to be available shortly.

This transparent tubing is extruded from a cellulose acetate butyrate formula of "Tenite" produced by Tennessee Eastman Corp., Kingsport, Tenn. The tubing is distributed by Julius Blum & Co., Inc., 532 West 22nd St., New York City.

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## New Literature

For your convenience in obtaining copies of new Literature use the coupon on page 89.

### 223—How to Save Heating Dollars

Air-Maze Corporation, 5200 Harvard Ave., Cleveland, is distributing an 8-page booklet on "How to Save Heating Dollars" with practical hints on how to get better results from your forced air heating system for less money.

### 224—Glass Adapability to Modern Needs

Pittsburgh Plate Glass Company, Grant Building, Pittsburgh, has prepared "Glass and Its Adaptability to Modern Needs" at the suggestion of the Division of Substitute Materials of OPM, as a possible means of aiding manufacturers in finding substitutes for strategic materials no longer available. Flat glass remains a readily available material.

The table of contents covers polished plate, laminated safety, window, carrara, mirrors, enameled Herculite, Nucite glass chalkboard, lighting, rough rolled glass (plate, figured and Coolite heat absorbing), and PC glass blocks, architectural and foam glass. Specifications are followed by industrial and general use.

### 225—Social Security Benefits

Commodity Research Bureau, Inc., 82 Beaver St., New York City, has prepared a 32-page booklet on social security for distribution by employers to their workers. All information was compiled from official government sources in an attractive red, white and blue cover design. The survey made by their Industrial Relations Division revealed that the great majority of employees did not realize how large a sum their employers were contributing to the various Social Security benefits. Ninety-five percent of employees in American industry do not know

that they and their families are entitled to substantial cash benefits from the Social Security Program while under 65 years of age.

Copies are offered to employers in quantity lots at nominal prices. All employers and executives are invited to request a free specimen copy.

### 226—Practical Arc Welding

Hobart Brothers Co., Troy, Ohio, offers "Practical Arc Welding" by W. J. Chaffee. 516 pages. 512 illustrations. Flexible, red fabrikoid cover. Copyright 1942. United States, price \$2, postpaid.

Part I is devoted to general welding information. Material covered includes the growth of arc welding; where arc welding is used; manufacturing applications; available metals and alloys; discussion of joints and welds; electrodes and filler rods; strength of arc welded joints; cost of arc welding; characteristics of the welding arc; welding symbols and their use; equipment for arc welding; development of welding personnel.

Parts II and III of the textbook are devoted to the complete series of arc welding lessons exactly as they are offered in the Hobart Trade School. This group of 41 lessons covers preliminary instructions; starting and manipulating the arc; common joints with bare electrodes; welding light gauge sheets with coated electrodes; welding with coated rods in all positions; pipe welding; welding cast iron; special tests; welding with the carbon arc; "long arc" method of welding copper; and specialized applications of arc welding.

Parts IV and V contain a complete dictionary of welding terms and twenty pages of helpful tabular data for operators and designers. The handbook also has an eight-page cross reference index for the reader's convenience.

This new handbook is easily comprehensible to beginners yet it contains a wealth of practical arc welding data and lessons for the technical man. Welders, potential welders, students, instructors, designers, engineers will find this text invaluable for reference or home study work.



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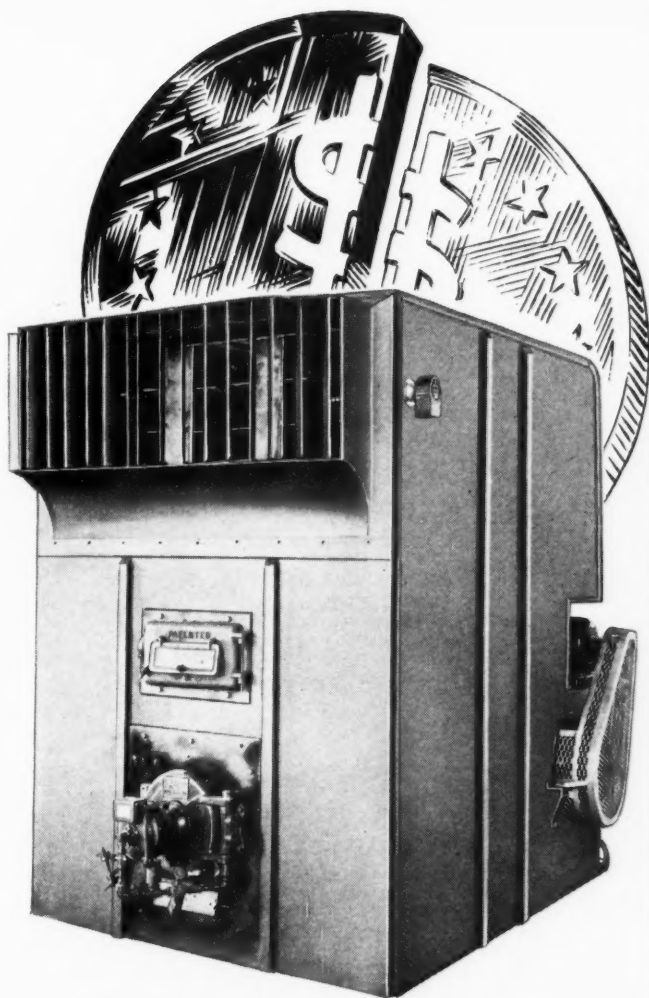
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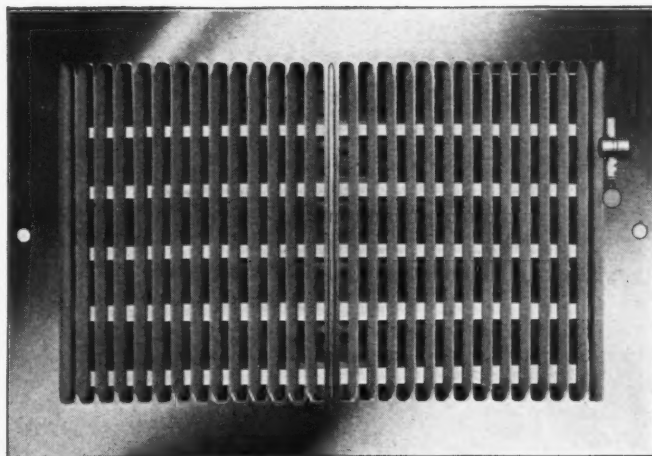
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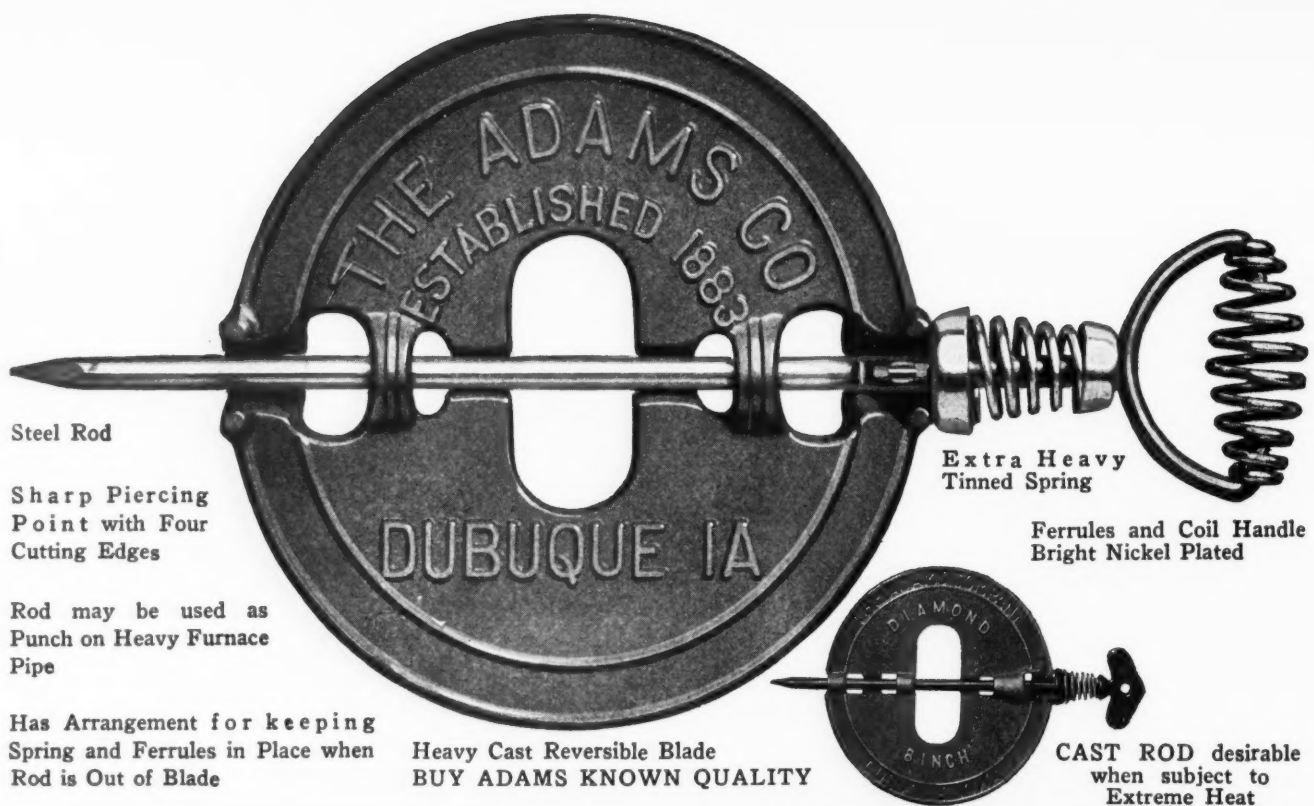
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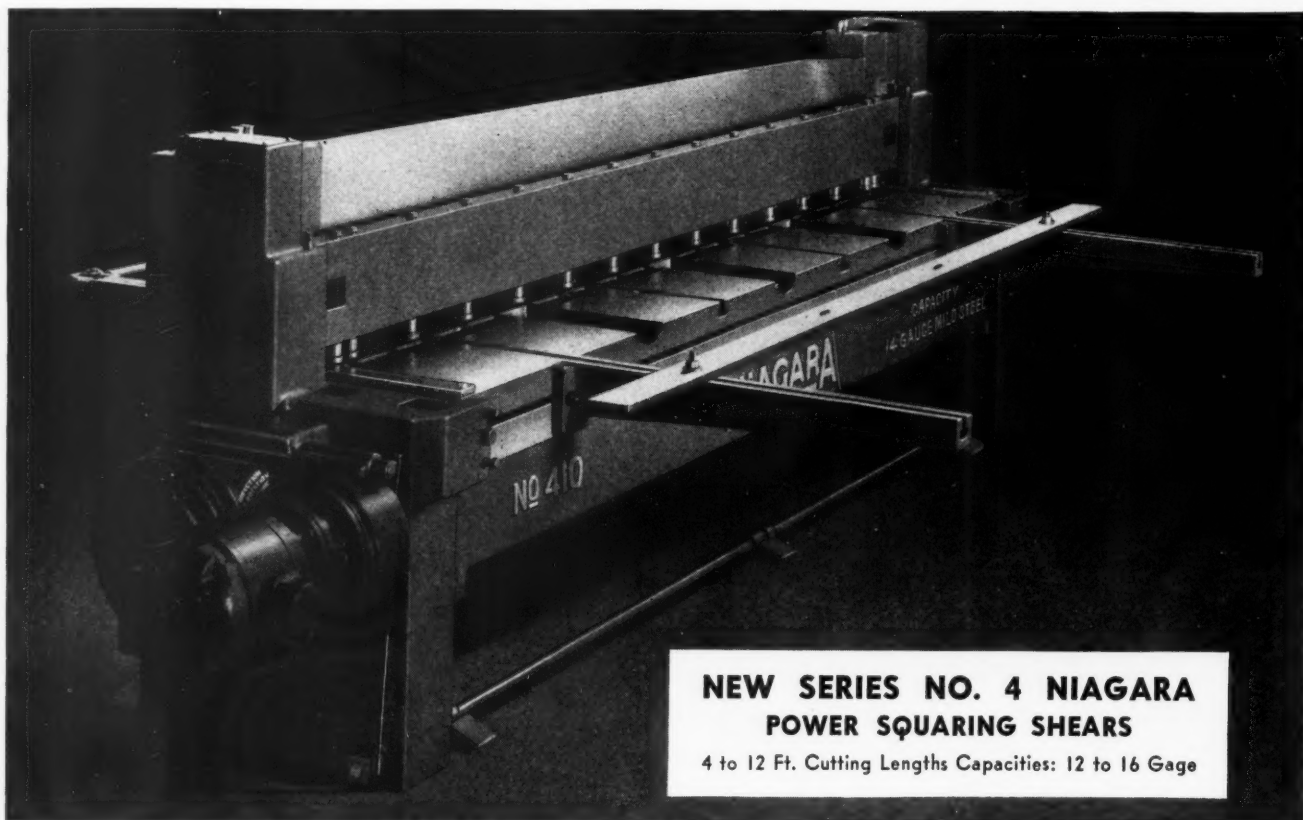
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nected. Standard equipment includes ball-bearing, self-measuring, parallel back gage, front and side gages, and four edge, solid tool steel knives. Niagara Machine & Tool Works, Buffalo, N. Y., Branches: New York, Cleveland, Detroit.

## New Literature

For your convenience in obtaining copies of new Literature use the coupon on page 89.

### 227—Variable Speed Transmission

Ideal Commutator Dresser Company, Sycamore, Illinois is distributing a 52-page catalog-handbook of recommendations application data, photos and engineering information, with a quick index source of reference for complete data on Ideal variable speed pulleys, variable speed transmissions, automatic tension control motor base, sizes, rated capacities, design and operating details, where applicable, how installed etc.

A free copy is available to design engineers, mechanics, superintendents, purchasing agents, consulting engineers and others.

### 228—How to Build Successful Fireplaces

The Donley Brothers Company, Cleveland, is distributing a new, ninth edition of their "Book of Successful Fireplaces—How to Build Them." This edition includes a complete treatise on the heat circulating type of fireplace. Its chapter on outdoor fireplaces has been revised in the interest of convenience and brings this phase of fireplace building more and more within the realm of certainty based on fixed principles.

While accent has always been on pyrogenetic factors, such as freedom from smoke nuisance, heat delivery and flue efficiency, designers also find considerable inspiration in its array of illustration and external design data.

There is considerable meat for architects in the chapter on corrective treatments, since it affords a review of reasons why fireplaces go wrong. The historical sketch gives a background for period treatments and presents many facts of interest. With 64 pages and more than 200 illustrations and designs the work covers exhaustively a highly interesting phase of home building. It is mailed free to professional architects. Price 25c to the public.

### 229—Metal Layout for Air Conditioning

"Air Conditioning Metal Layout" by Joseph J. Kaberlein—with practical, short and modern methods in laying out square, rectangular, and transition fittings used in heating, ventilating, and air conditioning—has been released by the Bruce Publishing Company, Milwaukee. 308 pages. Price \$3.75.

Kaberlein's 12 years of experience as a sheet metal worker, during which he was a pattern layout man and foreman, qualified him to write this handbook of information in which the simplest and most intricate fittings are laid out in sequence and in a language that any sheet metal worker will understand. Kaberlein is now instructor of sheet metal apprentices at Washburne Trade School, Chicago.

An important feature of the book is the proper sequence so necessary for successful instruction in sheet metal pattern layout. The fittings described in the book, in most cases, combine what would normally require two or more transitions, thus taking into consideration the limited space given to sheet metal workers to install ducts, elbows, change joints, and the like. The fittings described are not only space saving, but also give the exposed work a streamlined effect.

Each problem presented is drawn to scale, with dimensions ample for metal construction. The descriptions are clear and well organized, beginning with the various seams that are used to assemble the problems, their required allowance, and the methods of forming them. The demonstrations of these practical problems are made clear and simplified by the illustrations of all the patterns required.

Mathematical formulas applied to sheet metal work are included in the book, as is a comprehensive index.

Kaberlein is a member of the Sheet Metal Workers International Association, Chicago Union Local No. 73.

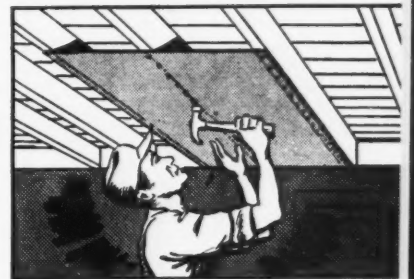
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## New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 89.

### 230—Automatic Heating Accessories Cat. 117

Robert Barclay, Inc., 122 N. Peoria St., Chicago, is distributing their Spring, 1942, catalog of automatic heating accessories for oil burners, stokers and forced air heating. Page 12 features Ken "sofsteel" tubing—copper coated and tinned and requiring no priorities for oil burner installations.

### 231—Welders Guide

Theo. Audel & Co., 49 W. 23rd St., New York City, offers their pocket size Welders Guide with essential and important facts covering welding methods, welders, electric, oxy-acetylene, thermit, unionmelt, sheet metal, spot, pipe, pressure vessels, various metals, airplane, hardening-facing, cutting and eye protection. Price \$1.

### 232—ASH&VE Guide

The American Society of Heating & Ventilating Engineers, 51 Madison Avenue New York City, announces the 1942 edition of the Heating, Ventilating, Air Conditioning Guide, containing 1,256 pages.

The Guide treats exhaustively every phase of heating, ventilating and air conditioning, and related phases of refrigeration. During the 20 years of publication, many men of long training and expert knowledge have contributed engineering data and general information, to make the Technical Data Section the accepted authority in every branch of the profession and the industry.

In this 1942 edition, a new chapter has been added on Fundamentals of Heat Transfer, which includes the basic equations for conduction, convection and radiation. A de-

tailed solution is given for a problem involving all three mechanisms of heat transfer.

Some revisions have been made in the chapters on Thermodynamics of Air and Water Mixtures. The Mollier Diagram for Moist Air has been redrawn, and a new Volume Diagram for Moist Air has been added.

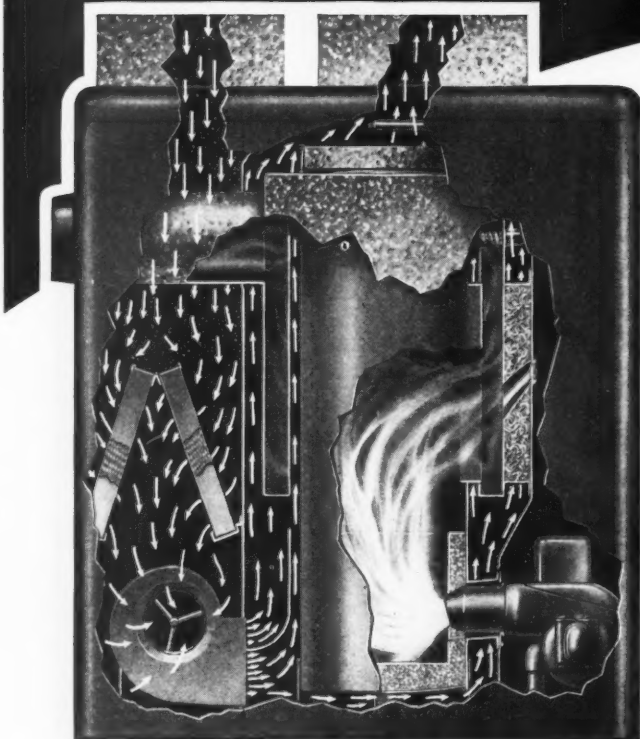
The data on Physiological Principles have been revised to include current knowledge on thermal interchanges taking place between the human body and the environment. The chapter on Central Systems for Comfort Air Conditioning has been completely rewritten. Revisions on the chapters on Air Distribution, Air Duct Design, Sound Control and Fans, provide new data on the design of air handling systems. A new air friction chart, developed at the ASHVE Research Laboratory, is included in the chapter on Air Duct Design.

The chapter on Radiant Heating has undergone major revisions and contains data essential for the design of radiant heating systems. A new duct chart has been added to the chapter on Pipe and Duct Heat Losses. In addition, other chapters have been reviewed and revised, which include Combustion and Fuels, Radiators and Convectors, Pipe, Fittings, Welding, Heat Transfer Surface Coils, Air Pollution, Air Cleaning Devices, Natural Ventilation and Water Supply Piping and Water Heating.

The Catalog Data Section has grown during the 20 years of publication. It has again been revised and gives factual data on the latest types of equipment. Leading manufacturers of heating, ventilating and air conditioning apparatus and materials present their products in five subdivisions, profusely illustrated and described. Much detailed information is given, including sizes and capacities which enables Guide users to determine the suitability of equipment for specific uses.

This year The Guide is bound in a stiff blue cover with gold stamping and individual copies can be obtained at \$5.00 a copy. A thumb-indexed edition is available with chapter tabs at \$5.50 per copy.

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## New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on this page.

### 233—The Inside of Arc Welding

General Electric Co., Schenectady, N. Y., has under way six one-reel, all-color sound motion pictures designed to help speed war efforts through the faster and better training of welding operators, according to an announcement by C. I. MacGuffie, manager of G-E arc welding sales. Titled "The Inside of Arc Welding," the films are being produced by the Raphael G. Wolff Studios, Hollywood, who have evolved a new technique for picturing this difficult subject in a dramatized and highly interesting manner.

When completed the pictures will be made available to public, private, and industrial welding schools.

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Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

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46	47	48	49			
223	224	225	226	227	228	229
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A Fireline lining raises the combustion temperature, increases the heating capacity of the furnace, eliminates smoke, soot and gas, and reduces ashes.

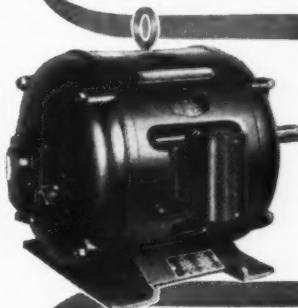
Fireline is a money maker for you — right now. Ask for Furnace Profits Plan which outlines each step for increasing your furnace profits — this season.



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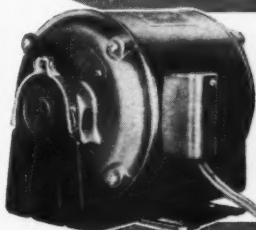
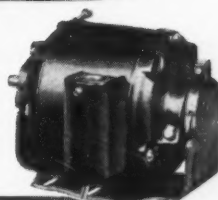
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No matter what type of air-conditioning equipment is involved . . . whether large or small . . . regardless of the torque, speed or current requirements, you can choose a motor from the Wagner line that is correctly engineered for the job. The five motors illustrated represent a few of the various types of Wagner motors used for air-conditioning appliances. Each motor has special electrical or mechanical characteristics that make it the ideal motor for certain applications.



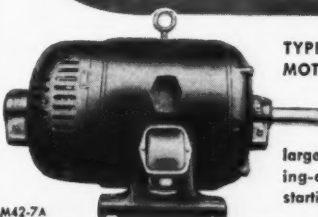
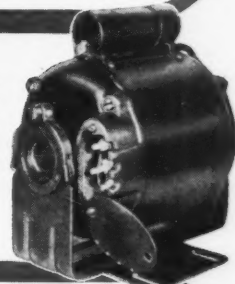
**TYPE RP POLYPHASE SQUIRREL-CAGE MOTORS** are made in 5 electrical types varied as to torque and current characteristics to take care of a wide variety of applications. 2 and 3-phase; 1/6 to 400-hp.

**TYPE M SHADED-POLE FAN MOTORS** are single-phase induction motors of simple construction. Ideal for fan and blower drives in which the fans are mounted directly on the motor shaft. Totally-enclosed and open-type; rigid or resilient mounted; 1/125, 1/80 to 1/40 and 1/30-hp.



**TYPE RA REPULSION-START-INDUCTION MOTORS** are single-phase brush-lifting motors having high starting-torque and low starting-current. The ideal motor for heavy-duty applications such as stokers, compressors, pumps, etc. Obtainable in various speeds, frequencies, and voltages; rigid or resilient mounted; 1/8 to 15-hp.

**TYPE RK CAPACITOR-START INDUCTION-RUN MOTORS** are single-phase motors suitable for driving refrigerators, household air-conditioners, and other appliances. Drip-proof or totally-enclosed endplates; rigid or resilient mounted; 1/8 to 3/4-hp.



**TYPE RT SPECIAL COMPRESSOR MOTORS** meet the demand for a poly-phase motor with high starting-torque and very low starting-current. Ideal for large compressors. The very low starting-current permits across-the-line starting. 2 and 3-phase; 40 to 100-hp.

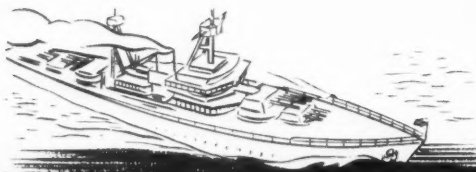
MA2-7A

Send FOR FREE BULLETINS MU-182 & MU-183

**Wagner Electric Corporation**

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

MOTORS • TRANSFORMERS • FANS • BRAKES



## FROM BATTLESHIPS TO BABY POWDER

### AIR-MAZE Serves an Amazing Variety of Uses



★ In hundreds of diversified applications . . . from ventilation of a battleship to clearing of dust in the air of a talcum powder plant . . . AIR-MAZE Filter Panels are depended upon to do a job, efficiently and economically.

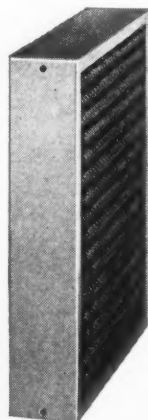
In planes, to protect the motors; in trains, to provide dust-free ventilation comfort; in printing plants, to clear the air of entrained ink; in hotel and restaurant kitchens, to eliminate fire hazard from grease; in factories and warehouses to protect products and provide clean air for workers; in munition plants; in paint spray booths; in paper mills; in institutions and private homes . . . wherever air filtration is needed to protect delicate machinery, to speed production, to promote health and comfort . . . AIR-MAZE Filter Panels are proving their amazing versatility.

Their complete adaptability to every air filtration problem is made possible by the scientific baffle-impingement principle embodied in every type of AIR-MAZE Filter Panel—which gives them better than 98 per cent filtering efficiency without clogging.

AIR-MAZE Filter Panels need no replacement. They can be cleaned again and again for renewed top-notch performance. They are fire-resistant—approved by *The Underwriters' Laboratories*. They are sturdy and lasting.

*Write for our engineers' recommendations on your air filtration problem*

**AIR-MAZE CORPORATION**  
5130 Harvard Ave., Cleveland, Ohio



## With the Manufacturers . . .

### Famous 4th Annual Banquet

The Banquet of The Famous Furnace Co., 6420 Woodland Avenue, Cleveland, manufacturers and jobbers of sheet metal, furnaces and roofing supplies, was held Saturday, December 13th, 1941, at The Fenway Hall Hotel in Cleveland.



For the 4th consecutive year, bonuses were distributed to the employees by Hyman Blaushild, president of the concern.

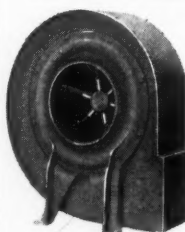
During the dinner, President H. Blaushild spoke to the employees regarding work conditions, and said that he would like to feel that some of the bonus money would be used by his employees in the purchasing of United States Defense Bonds and a contribution to the Red Cross. All the employees agreed by donating one days wages each. The amount has already been sent to the Red Cross.

The employees presented Mr. Blaushild with a gift in appreciation for his many kindnesses.

**Today's War-Time  
Industrial Market  
is Your  
BEST BET NOW**

**—LET CLARAGE EQUIPMENT  
HELP SELL THE JOBS!**

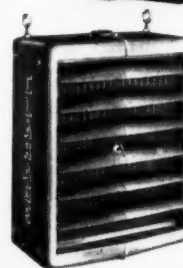
New war plants—and plants being converted—need heating, ventilating, exhaust and blow pipe installations. This high priority business can be your salvation. Specify Clarage Fans, Blowers, Unit Heaters—Nationally known and Nationally accepted, these highest quality air handling products help you land the jobs. Write for any information desired.



EXHAUST FANS



VENTILATING FANS



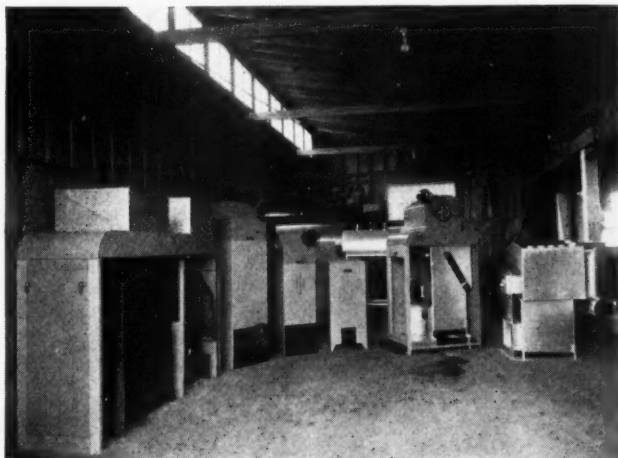
UNIT HEATERS

COMPLETE  
AIR CONDITIONING  
• COOLING  
• VENTILATION  
• FACTORY HEATING  
• MECHANICAL DRAFT  
• FANS and BLOWERS  
FOR INDUSTRIAL NEEDS

**CLARAGE FAN COMPANY—KALAMAZOO, MICH.**  
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES



## With The Manufacturers . .

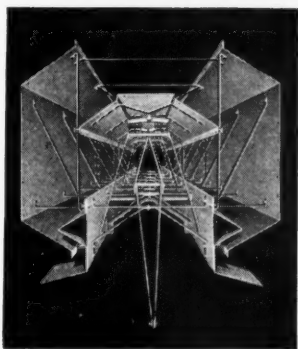


A portion of the manufacture under way in the plant of the Parker Heating and Manufacturing Co., 1627 Third Ave., South, St. Petersburg, Fla. The company has a standard line of manufacture which includes 23 distinct set-ups.

### Thor Expands Service Facilities

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, manufacturer of Thor portable pneumatic and electric tools, is expanding service facilities. The opening of the new Detroit building marks the completion of the fourth new service station within the past 15 months. Other newly constructed Thor buildings for branch offices and service stations have been opened at Philadelphia, San Francisco and St. Louis. Each of these offices is completely equipped with both men and machines to render prompt and efficient repair and reconditioning service to all users of Thor pneumatic and electric tools.

## BURT MONOVENT Continuous Ridge VENTILATOR



**Ranks High  
in  
Defense  
Construction**

• Monovent has recently been installed on many outstanding plants devoted to defense production. Among its many superior qualities are — it exhausts a large volume of air along entire length of the building—costs less than unit ventilators of same capacity—presents better appearance—non-mechanical, will not clog—and is simple and easy to install on any type roof. Available in all materials. Don't hesitate to call on Burt Engineers to help you estimate.

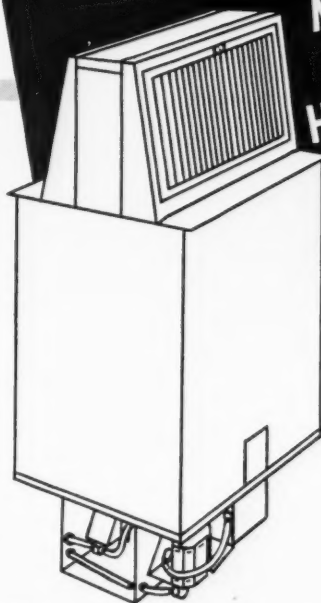
**THE BURT MFG. CO.**  
ROOF VENTILATORS • OIL FILTERS  
EXHAUST HEADS

301 Main St., Akron, Ohio

SEND  
FOR CATALOGS  
Burt Engineers  
are glad to  
help on plans

## THIS OIL-BURNING FLOOR FURNACE

Meets Your  
Defense  
Home Heating  
Needs



There are seven reasons why the oil-burning H. C. Little Floor Furnace will fit your requirements for low-cost heat in small defense homes:

1. LISTED by the UNDERWRITERS' LABORATORIES — for cheap No. 3 furnace oil (27° Diesel).
2. O.K. for F.H.A. FINANCING. Thousands already installed on F.H.A. terms.
3. TWO SIZES — The No. 70-41 has a 47,250 B.T.U. Output — The No. 100-41 has a 75,000 B.T.U. Output.
4. TWO STYLES — Single (flat) register or dual (wall) register models.
5. TWO TYPES OF CONTROL — (a) Manual lighting, or (b) Electric Ignition with Automatic Control.
6. CLEAN BURNING — No Pilot Light to smoke, no soot or hard carbon.
7. DEPENDABLE — Many H. C. Little Floor Furnaces have been in continuous use over nine years, with satisfactory results for their users.

*Mail this coupon today*

**H. C. LITTLE  
BURNER  
COMPANY**  
San Rafael, Calif.

Please send complete data on your oil-burning Floor Furnace.

Name

Address

City  State

Warehouse Stocks and Direct  
Factory Representatives in Boston,  
Newark, Baltimore, St. Peters-  
burg, Aurora, Ill., Seattle and  
Portland, Oregon.

## Priority Orders

(Continued from page 33)

der, they must show the serial number of each PD-1-a certificate included in the order.

Preference Rating Order P-100, which is the Repair, Maintenance, and Operating Supplies Order and which was issued in order to provide priority assistance to the specified list of producers so that their operations would not be held up through the need of small repair parts, has in general been the most misused order in the priorities field. Preference Rating Order P-100 covers only repair, maintenance or operating supplies and cannot be used to assign a rating on the purchase of capital equipment. Neither can it be used to build up an inventory.

Any of the producers listed in the order may assign an A-10 rating to items in those three classifications by endorsing the needed certification on the purchase order. No formal application to operate under the order is needed and neither is it necessary that the producer have a copy of the order in his possession. It is required, however, that the producer must read the order and become familiar with its provisions. In all cases where any doubt exists in the mind of the producer he should check with the local office of the Priorities Division, War Production Board. It is required that the certification appear on the purchase order and that the certification be manually signed. The producer must retain endorsed copy of such purchase orders or contracts for a period of two years. The P-100 order assigns only one rating and that rating is A-10.

## P-84 Maintenance Order

(Continued from Page 31)

revoked or amended at any time as to the Installer or any Supplier. In the event of revocation, deliveries already rated pursuant to this Order shall be completed in accordance with said rating unless the rating has been specifically revoked with respect thereto. No additional applications of the rating to any other deliveries shall thereafter be made by the Installer or Supplier affected by such revocation.

(m) **Applicability of Priorities Regulation No. 1.** This Order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1 as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this Order shall govern.

(n) **Effective Date.** This Order shall take effect immediately.

Issued this 13th day of March, 1942.

(Signed) J. S. Knowlson,  
J. S. Knowlson,  
Director of Industry Operations.

### August E. Riester

August E. Riester, vice president of the Riester & Thesmacher Co., sheet metal workers, 1526 W. 25th St., Cleveland, died March 28. Mr. Riester had been in ill health for two years and had been in St. John's Hospital since suffering a heart attack on February 23. Mr. Riester was born August 29, 1873. In 1900, with the late George F. Thesmacher, he founded the Riester & Thesmacher Co.

Surviving are his wife; a son, Chester; and a daughter; a brother, Frank; a sister; and two grandchildren.



## Veterans ON THE JOB!

Building the world's largest generator is a man-size job for any organization. The outer rim of the rotor is made up of more than 12,000 pieces of laminated steel.

To cut and fit this mass of steel sheets is a job for veterans—both men and tools. Mistakes, poorly fitting pieces, ragged edges, are *out!*

On this job, as on most sheet metal cutting jobs, Stanley Unishears are making straight cuts, angles, curves, with hairline accuracy. Fast—up to 15 feet per minute—Unishears leave smooth finished edges with no distortion of metal—no waste.

Both portable and stationary models to handle sheet metal up to 10 U. S. Gauge.

Stanley Electric Tool Division, The Stanley Works, 131 Elm Street, New Britain, Connecticut.



**STANLEY UNISHEARS** *The Electrically Driven Hand Shears*

# New MONOGRAM

## VICTORY MODEL

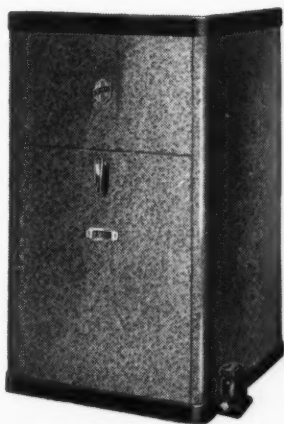
### OIL BURNING FURNACE

For Low Cost Defense Home Heating

#### MODEL No. 73

Manually Operated  
Gravity Oil Furnace

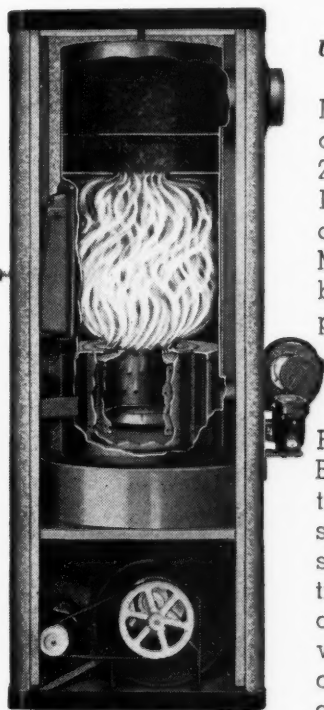
Insulated cabinet, one - inch Fiberglas, 26 $\frac{1}{4}$ x26 $\frac{1}{4}$ x50 $\frac{1}{4}$  inches high. 18-gauge combustion drum with exclusive MONOGRAM double baffle feature, made possible by a shorter, wider flame of the MONOGRAM patented Turbulent Flame Burner. 53,000 BTU output, finished in brown ripple, heavy, durable construction.



**MODEL No. 74**—Same size and specifications as Model No. 73, illustrated above, except that it is equipped with the exclusive MONOGRAM Trimatic rheostat control which can be recessed in the floor above furnace or mounted on wall. This dial controls the oil input to the burner and controls the R.P.M. of blade fan, which provides mechanical draft and also boosts circulation and heated air. 63,000 BTU output.

#### MODEL No. 104

Upright Full Forced Air  
Oil Burning Furnace



Insulated cabinet, one - inch Fiberglas, 27x27x66 inches high. 18-gauge combustion drum with exclusive MONOGRAM double baffle feature made possible by a shorter, wider flame of the MONOGRAM patented Turbulent Flame Burner. 70,000 BTU output. Limit control and blower switch. AP thermostat with oil-air control. Separate mechanical draft blower which operates only on high fire. Rex air control and blower for forced circulation. Filters and humidifier, extra.

**The Quincy Stove Mfg. Company**  
QUINCY ILLINOIS

# Let Coolair

TRADE MARK

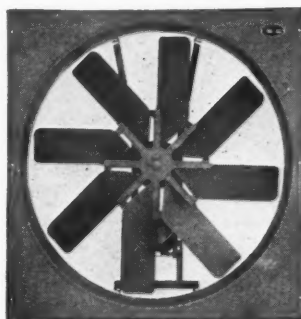
## Take up the Slack!

..... Caused by Delayed Deliveries  
and Wartime Restrictions on Items  
and Materials in Your Field

A VAST and rapidly growing demand for Coolair installations in war production plants, offices and defense housing projects from coast to coast offers you a great opportunity to expand your field! You can keep your sales up by keeping your salesmen busy contacting superintendents, engineers and managers of

manufacturing plants and supply units in war production . . . and such civil necessity prospects as laundries, bakeries, hotels, hospitals, homes, theaters, recreation halls and restaurants.

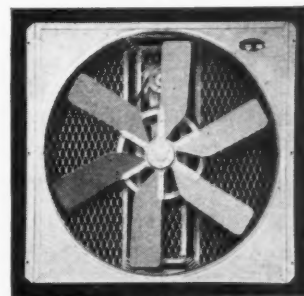
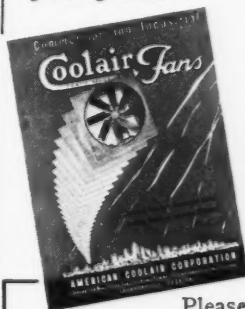
Join the many other dealers in this fast-developing field who are pushing Coolair Commercial and Industrial Exhaust Fans, and finding them easy to sell—for Coolair Breeze-Conditioning is an already established necessity for increasing employee efficiency and speeding war production.



GENERAL PURPOSE FAN

Units with small motors and sound absorbing springs for ultra-quiet installations such as hospitals, homes and offices; heavier units with larger motors for commercial and industrial application.

Get this new Coolair Industrial Bulletin at once. It shows Coolair Fans at work, describes the full line and gives performance data and installation plans for a wide variety of applications in this great and growing field.



WINDOW FAN

Easily mounted in any standard window. For defense housing, small stores, offices and all smaller type installations.

**CLIP THIS COUPON**  
and Mail It Right Now!

Please rush me the new Coolair Bulletin and dealership information.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



**AMERICAN COOLAIR CORPORATION**  
Manufacturers . . . JACKSONVILLE, FLORIDA

# Three Reasons Why RiP-CLEAN Air Filters Make More Money For You



Renew filters by simply  
ripping off clogged fibre  
sheets! It's as easy as  
that . . . with the RiP-  
CLEAN Air Filter!



1. Longer Mark-Up. Research Filters pay you added profits.
2. Exclusive Selling Features. No other filter has RiP-CLEAN Construction.
3. Complete Sales Helps. Planned to help you sell repairs, as well as filters.

Standardize on the Research RiP-CLEAN Air Filter! You make more money with it . . . conserve valuable war materials. For RiP-CLEAN Filter pads contain critical war materials. The wire grids are used over and over, conserving valuable materials for Uncle Sam. It's easy to renew RiP-CLEAN filters. Just rip off top layers. No cumbersome cleaning with steam or hot water. No vacuum cleaner or brush needed. No expensive frames to salvage. Write for full RiP-CLEAN details.

## RESEARCH AIR FILTERS

**RESEARCH PRODUCTS CORP.,  
MADISON, WIS.**

## The Furnace Limiting Order

(Continued from Page 28)

owners concur in this thinking. No inconvenience or sacrifice will be permitted to interfere with this drive to win the war.

But we also know that workers can't live in tents; that homes without heat are as bad for morale and efficiency as an enemy attack; that workers and owners can't be expected to do without simple needs—and certainly heat is essential.

If as far as Washington can see at the moment shows only enough material for 200,000 furnaces let's go ahead on that basis—but let's not believe that if more furnaces are needed we won't get them. We will.

Let's make and install the 200,000 for which we have material promised but be ready to produce and install the additional furnaces when and if it becomes evident that we can't get along without them.

After all, Washington is only setting up minimums, hoping—as we all hope—these minimums will suffice. If they won't—if Washington must revise its thinking—this industry will get material.

We are not like the radio or washing machine industry. Not even like the automobile industry. We just can't get along without heat.

PAT NO. 2277436

ROOF LINE

CEILING

**VITROLINER**  
-the Superior Vent Pipe-

Trade Mark Registered

2515 ARCHER AVENUE • CHICAGO, ILL. • PHONE CALUMET 4362

## Vitroliner for Victory in low Cost DEFENSE HOUSES

Vitroliner, a practical insulated complete Venting System, is being used extensively for low cost housing projects.

Vitroliner features are:

1. Quick, easy construction.
2. Durable, space saving, uniform.
3. Provides necessary draft (double the draft of masonry chimney).
4. Demountable construction.
5. Fourteen years of practical experience in the field.

See Sweets Catalog, Sec. 26, Page 112.  
See Sweets Builders Catalog,  
Section 4, Page 2.

Write for further details to

**CONDENSATION  
ENGINEERING  
CORPORATION**

## Bits and Pieces

(Continued from Page 29)

replaces and consolidates the many agencies engaged in the housing program. We will, therefore, leave until next issue the complete description of who's who, what's what,—and why.

So that readers will not be surprised when they visit their local housing offices and find a house cleaning under way, we can explain here briefly that FNHA will be the top organization over three divisions, as follows: 1—FHA (remains much the same and will offer the same functions as heretofore; 2—Federal Home Loan Bank Administration (will take over the former functions of the Federal Home Loan Bank Board, Federal Home Bank System, Federal Savings and Loan Insurance Corp., Home Owners Loan Corp., United States Housing Corp). USHA is up for liquidation. The third division is the Federal Public Housing Authority which takes over USHA, Defense Homes Corp., Non-Farm Public Housing from FSA, and Defense Public Housing.

The point of greatest interest to most readers is that so far as we can hear it is still government's intention to encourage private building of war housing. Washington still says that the big bulk of needed war housing must be privately financed and built. And the program still stands at 150,000 units government financed and 200,000 privately financed.

The second most interesting point is that in the original allocations for 200,000 units under PM 1192 the average priority approved job was for 13 houses, proving that small builders in thousands of projects are building houses. This trend likely will accelerate. Small heating contractors thereby have an opportunity to install furnaces.



**MISS JONES—  
TAKE A LETTER  
TO ALL WAR  
RESTRICTED  
HEATING EQUIPMENT  
DEALERS.**

**DEAR DEALER:**  
*Re: Those Commercial  
Installations*

I'm a lucky guy. And that makes you lucky too! I'm still available for you to sell because, while using but a mite of critical metal, I provide fuel savings ranging from 5% to 25% in every installation. I'd like to go to bat for you in 1942, rounding out your restricted heating line, keeping your profits and volume intact. About 90% of the homes, schools, churches, stores and factories in your community need me. Anyone can sell me! And I pay a worthwhile profit. I'll help you keep your chin up in 1942!

Sincerely, "Scotty" Field

### Field Commercial Controls Cut Fuel Consumption Up to 25%!

Right now the market's hot for commercial installations. And the Field line—standard and motorized—gives you complete coverage. Write for complete details.



**FIELD CONTROL DIVISION**  
**MENDOTA, ILLINOIS**



## JOHN ZINK BURNERS for Defense Power Boilers

Fuel scarcity is no problem if you use John Zink Series Y Burners because this burner burns either, or both, gas and oil with the same heat pattern.



JOHN ZINK SERIES Y REGISTER  
TYPE COMBINATION BURNER

- Independently removable fuel guns.
- Uninterrupted Burner service.
- Easy to remove fuel guns—Feather weight type, one man can remove for inspection and cleaning while the boiler remains in service.
- Easy to operate.
- Simple in construction.

Write for Information

## John Zink Company

TULSA, OKLA.—4401 S. PEORIA AVE.

Chicago, Ill.—7309 E. End

New York City—342 Madison Ave.

Houston, Texas—1401 Waugh Drive



**THE R & G  
THIN MAN  
IS AT YOUR  
SERVICE!**

The R. & G. "Thin Man" Register is doing an all-out job on many Defense Housing Projects. Other R. & G. registers and grills are reporting for duty in defense plants of all kinds. While R. & G. products for non-defense uses are subject to curtailment and delays, our officers will be pleased to confer with you on any problem within our scope.

**Register & Grille  
MANUFACTURING CO., Inc.**  
70 BERRY ST. BROOKLYN, N. Y.

## Kruckman-Housing And Heating Snarl

(Continued from Page 37)

This \$260,000,000 annual industry simply has been ordered to cease manufacturing radios, phonographs, cabinets, tubes and other parts and, with minor exceptions, the various corporations or firms have been given specific tasks in producing similar equipment for military uses.

A few firms have been designated to manufacture what may be called a "Victory" radio and phonograph with a very limited output, and others have been assigned to the job of providing necessary parts and supplies to maintain the 60,000,000 radios in American homes. The whole integrated industry in effect becomes a cartel for the duration, producing under direct control of the Government the inventories scheduled by the Government. You have thus the pattern of an over-all control of all parts of an industry, from the moment the raw materials flow from the Government stockpile until the finished product reaches the ultimate consumer, whether the consumer is a private individual or the Federal Government.

It is not difficult to envision how the heating equipment industry will be integrated and geared to produce war equipment, and heating equipment for the civilian population. Service for non-war civil needs will be focused on repairs and replacement. It should be marked well that in every possible incident the WPB stresses that repairs should come before replacement. A repair job saves the material that is daily becoming more desperately short.

**WHITNEY LEVER PUNCHES**

**No. 4B PUNCH**



Length 8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—¾" to 1" by 64ths.

**No. 91 PUNCH**



**CAPACITY**  
¼-inch hole through ¼-inch iron; ⅜-inch hole through ⅜-inch iron; 2-inch hole through ¼-inch iron. Depth throat, 5 inches. Weight, 82 lbs.

**No. 1 PUNCH**



Length—34 inches. Capacity—¼-inch hole through ¼-inch iron. Punches and dies in sizes from ⅜ to 1 by 64ths.

**No. 6 PUNCH**



Length—26½ inches. Capacity—¼-inch hole through ⅜-inch iron; especially adapted for button punching or template work. Punches and dies ¼" to 1" by 32nds.

**No. 2 PUNCH**



Length—23 inches. Capacity—¼-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to 1-inch by 64ths.

**CHANNEL IRON PUNCH**



Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity—¼-inch hole through ¼-inch iron.

**We have tools for every purpose needed by Sheet Metal Contractors.**  
*Ask your Jobber.*

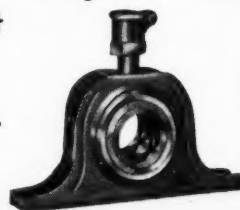
**W.A. WHITNEY MFG. CO.**  
636 RACE ST. ROCKFORD, ILL.

## RANDALL BEARINGS for War Production

Our war production equipment must be prepared to work without faltering for the duration . . . must face every emergency . . . must be equipped with bearings that will not fail. Assure yourself of bearing security. Randall sturdy Pillow Blocks will do the job. Self-aligning and self-lubricating Randalls are easy to install, quiet and economical. They are durable, dependable; give trouble-free service with only minimum maintenance. Wherever . . . whenever bearings must run smoothly, quietly, without failure, use Randalls.

Write today for information.

One-Piece Steel  
Housing Pillow Block



**RANDALL GRAPHITE PRODUCTS CORP.**  
Dept. 411 609 W. Lake St. Chicago, Ill.

## Allocation Is a Wraith

The question of allocation of materials is rather difficult. It has been announced that WPB has allocated material for the building of 200,000 or 350,000 housing units. It has been assumed that materials would be made available for the construction and equipment of war area dwellings somewhere within this range of numbers. The trouble is the term "allocation of materials" does not have the same significance to Mr. Nelson and his immediate associates that it has to those further out in the periphery of WPB and to those entirely divorced from WPB or officialdom.

To the casual citizen, allocation means that a certain amount of material will definitely be set aside to be allocated for use in furnaces, or other things, that are important to our immediate needs. It has the same meaning to many officials in WPB. But to Nelson and those within his immediate circle the term means that in the general schedule of war program a rough bulk of theoretical raw materials has been loosely set aside as an equation bearing on the total problem; they do not have in mind specific quantities or specific ultimates; they simply use the equation as a movable figure, to be reduced, to be increased, even to be eliminated, if future considerations make it essential.

Thus, when they say materials have been allocated for 200,000 or 350,000 war area dwellings, it does not mean the actual materials have been subtracted from actual totals they already have under real control; it means they expect to make available potential quantities from purely potential supplies. To regard these announcements as an insurance of actual supplies is deceptive. In a sense an allocation in this category is chiefly justification for the effort to strive to secure

## KEEP THE HOME FIRES BURNING WITH LESS COAL

## GEHL Stokers

are a justifiable purchase for new buildings or modernizing projects. You can sell them as coal, time and money savers, and prove it by the records of thousands of installations in homes, institutions and industrial plants.



"Stoker Sales are blowing a Gehl."

The Gehl has an all-cast chassis that resists rust from basement dampness or acids that may be in fuel. The Gehl Air Governor, Unit Coal and Air Tube, and retort design, all promote efficient combustion and economy of operation.

Domestic, commercial and industrial models—bin and hopper fed. **WRITE** for literature and dealer plan.

**GEHL BROS. MFG. CO.**

Established 1867 Dept. BD-800 West Bend, Wis.

## BUY WHITNEY-JENSEN METAL-WORKING MACHINERY and HAND TOOLS for LONG LIFE and ACCURACY

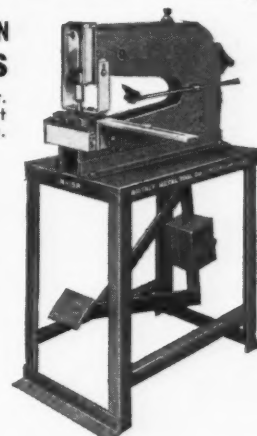
### TOGGLE-ACTION FOOT PRESSES

Linkage multiplies foot power. Four sizes—7", 10", 18", 24" throat depth. Capacity 2" hole in 16 ga. iron, 200 holes per minute.



### IMPROVED No. 17 BENCH PUNCH

Five new features for better service. Capacity 1/4" hole in 1/4" iron. Three punches and dies included.



### No. 5 JR. PUNCH

A popular item of wide usefulness. Capacity 1/4" hole in 16 ga. iron. In handy metal kit box with 7 punches and dies.

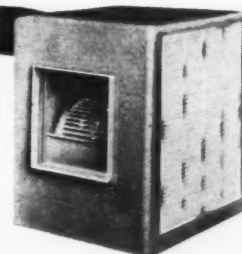
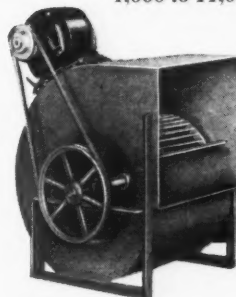


**30 YEARS EXPERIENCE  
BUILDING SHEET METAL TOOLS**

**WHITNEY METAL TOOL COMPANY**  
91 FORBES STREET • ROCKFORD, ILLINOIS

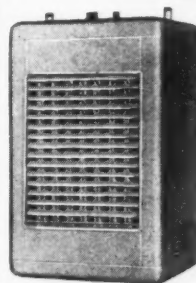
## AIR COOLERS

15 Models  
1,000 to 11,000 C.F.M.



## BLOWERS

Standard and heavy duty blowers—6" to 66"



## UNIT HEATERS

Blower and fan types  
Gas-fired  
Self-Contained  
Four sizes



## FLOOR FURNACES

Floor and dual register models  
Three sizes

Write for complete catalogs

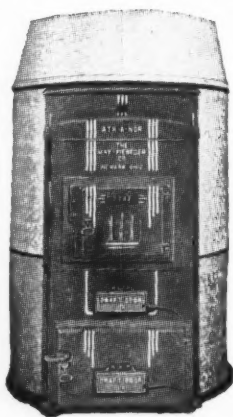
**UTILITY  
FAN CORPORATION**

4851 S. Alameda St. Los Angeles, Calif.

## 50 YEARS OF LEADERSHIP *The Time-Tested* ATH-A-NOR

Furnaces, like any other piece of merchandise, are only as good as the people who make them. The May-Fiebeger Company has been making the ATH-A-NOR Furnace illustrated for over fifty years, and the fact that it will perform with unusual efficiency and economy is backed up by hundreds of satisfactory installations.

If you've been looking for a fast-moving, top performing gravity furnace to round out your line, investigate the ATH-A-NOR now! A postcard request will bring literature.

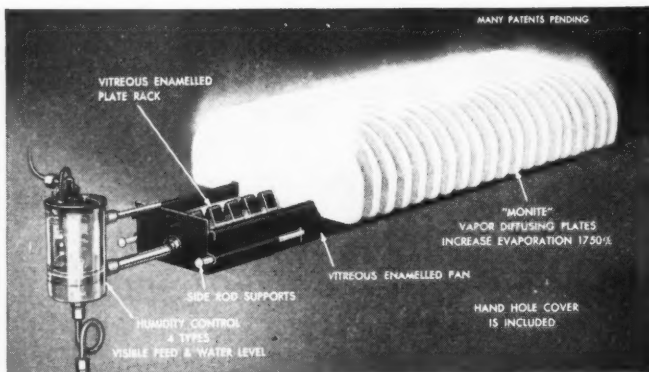


- QUALITY
- ECONOMY
- EFFICIENCY

... write today  
for further information!

MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS

**MAY-FIEBEGER COMPANY**  
NEWARK OHIO



**MONMOUTH** gives "honest  
to goodness" humidification!

- Best Engineered • Highest Capacity
- Largest range of sizes • Accurate capacity ratings
- Most Attractive and Modern
- Most Dependable and Durable
- Visible Feed • Visible Water Level

FREE! Get our Humidification Calculator & Literature. Also ask for folio "Adapting Your Business for War Times."

**MONMOUTH PRODUCTS COMPANY**  
1933 E. 61st ST., CLEVELAND, OHIO

**MONMOUTH**  
*The Greatest Name in Humidification*

materials when there is a specific job to do. It is proper to carry these allocations in your computations of expectations, but it is improper to use them as a rockbottom basis to draw upon as credit in a priority bank.

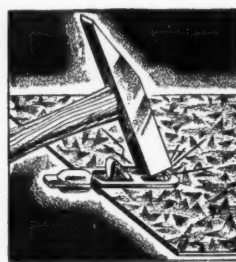
Always bear in mind that what the publicity mill grinds out about WPB activities is apt to be short of the inner facts. There are \$30,000,000 a year worth of publicity experts in WPB and it is their job to sell the war and the war effort to the public. It is the most natural thing in the world that they should put their best foot forward and give the situation the smoothest polish. The unhappy aspect of the huge publicity machine is that it is apt to be uncertain and that it uses words to cloak information, not to reveal it. And it has acquired a patina of arrogance that is akin to the glassy smooth aloofness of the bank official in his heyday.

When, as, and if the furnace industry passes into more concentrated control under Government; when the various production functions of the now independent industry units are programmed by the Government, then it is quite likely the industry will be more apt to be informed what materials are available and what quantities may be used for specific purposes. But even then it is probable the schedules will shift and change, as the supply increases or decreases. It is obvious there can never be a stable basis of supply so long as this war lasts. Each day brings a shift in emphasis as the needs of this or that segment of the vastly scattered operations changes. To some extent it will always be necessary for those who need the materials to fight for their share; and those who are the best fighters will get theirs first and get the best of the deal.

## E-Z-ON

*damper regulators...*

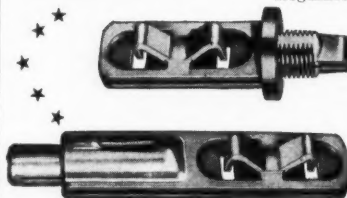
Applied with a HAMMER . . .  
Cuts time in HALF!



You have no rivets, screws or cotter pins to bother with in E-Z-ON Damper Regulators! Just slip them over the damper edge, drive the lugs through with a blow of the hammer, then clinch them . . . And you have a tight-fitting, rattle proof job—in HALF the time usually required!

In addition to QUICK INSTALLATION, E-Z-ONS have other advantages appreciated by Sheet Metal Men and Contractors. They're low in cost, strong, durable, made of cadmium plated STEEL, and have a new style of Wing Nut that permits greater leverage for hand or wrench tightening.

For better, easier Damper Assemblies ask your favorite Jobber for E-Z-ON Damper Regulators, or write for details.



**E-Z-ON**  
"Snap-Tite"

Damper  
Regulator with  
Retractable  
Tail Piece.

**M.A. GERETT CORP.**  
2947 NO. 30TH STREET \* \* \* MILWAUKEE, WISCONSIN

We do not yet know, at this writing, how drastic the building freeze order will be. We have been shown tentative drafts that would stop *all* building and construction, except in war areas and in urgent ultimate emergencies elsewhere. The order has been in the making since last December and it has varied from a rigid licensing of *all* building and construction projects everywhere, to exemptions of \$1,000 for residential building and \$25,000 for industrial projects. One version made an exemption of \$500 for any kind of residential job outside of war areas. This meant that materials would be provided for projects within the exemptions where ever they might be located. Sullivan Jones, head of the legal staff in charge of Building and Construction Priorities, is credited with standing out for complete, over-all shutdown of all kinds of building and construction anywhere except in war areas. There would, of course, be exemption for the materials needed for repairs and replacement in buildings at any place. And the complete prohibition would in no way interfere with the war area building program under FPHA.

### Death of F. M. Parks

Frank M. Parks, who for over 40 years has been connected with the sheet metal and heating industry in Aurora, Illinois, passed away on March 17th in Sarasota, Florida. The funeral was held on March 21st, at Aurora. His death occurred only three months after the death of his wife, Mrs. Verna A. Parks.

In 1901, Mr. Parks became associated with Messenger & Parks Manufacturing Company as a sheet metal worker and later as foreman of the shop. In 1914, he bought the interests in the firm held by his brother, Vernon H. Parks, and for the past several years has been secretary and treasurer.

## THESE ARE *Your Customers!*



### YOU'LL SELL THEM FASTER WITH **HESS** QUALITY EQUIPMENT

Defense workers, bankers, salesmen—these are your customers—people who appreciate the precision craftsmanship of the HESS line of quality heating equipment. You'll profit by HESS' financing and territory plan.

#### DEALERS:

Write TODAY for New 1942 Portfolio!

### HESS WARMING & VENTILATING CO.

1211 S. Western Avenue CHICAGO, ILLINOIS  
Founded 1873

#### IN 1942 FEATURE—

selling, modernizing, replacements and repairing with

- ★ HESS Blower Filter Units
- ★ HESS Welded Steel Furnaces
- ★ HESS Automatic Oil Burners
- ★ HESS Automatic Coal Stokers

Quality Equipment from HESS  
Costs Less!

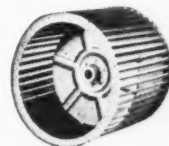
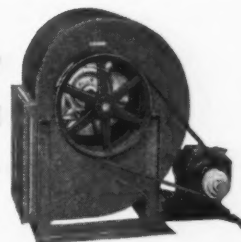
## YOUR BLOWER REQUIREMENTS

available at

### Schwitzer-Cummins Company

#### ● BLOWERS FOR EVERY PURPOSE

HY-DUTY Blowers, 9 3/4" to 25".  
Top and Bottom Horizontal, and Top and Bottom Vertical Discharge.  
Top and Bottom Motor Mounting.  
Dual Units also available.

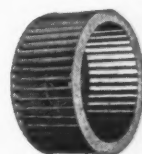


#### ● CENTER DISC WHEEL

Double Inlet, Double Width.  
Reinforced Center Disc.  
Designed for Modern Air Conditioning and Heating Applications.  
Sizes, 4 1/2" to 50".

#### ● SINGLE INLET WHEELS

For Oil Burner, Stoker, and Air Conditioning Applications.  
Sizes, 4 1/2" to 50".  
Variety of Blade Lengths for each diameter.



#### ● ENGINEERING DATA

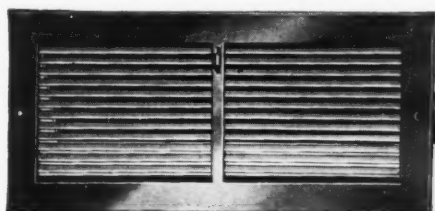
Write for Catalogues showing complete Performance Data.  
Experienced Engineering Department available to help solve your Air Handling Problems.

**BLOWER DIVISION**  
**SCHWITZER-CUMMINS COMPANY**  
125 FAN STREET INDIANAPOLIS, U. S. A.

## NEW

### AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



No. 822 Wall Register — Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment. Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.  
Rock Island, Ill.

Gentlemen:

Please mail me a copy of your dealer's net estimating book.

Name .....

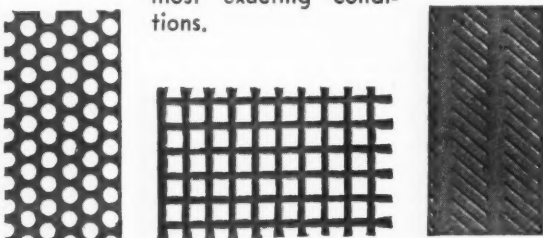
Street Address .....

City and State .....

# PERFORATED METALS

## ARE ESSENTIAL In Times of War and Peace

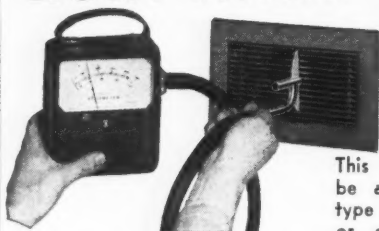
They are used in the manufacture of explosives and ammunition, flame arresters, airplanes, battle-ships and in many important and essential industries such as the processing of grain, food products, chemicals, metals, coal, petroleum, etc. We make all sizes and shapes of holes to meet the most exacting conditions.



**The Harrington & King Co.**  
PERFORATING

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

## NOW! ACCURATE AIR VELOCITY MEASUREMENTS at INTAKE GRILLES!



This new jet attachment can be added to existing Tube-type Velometers now in use, or can be purchased with

other standard jets and new Velometers. The new intake grille jet is offered only in the spot type since the center reading only has proven to be sufficiently accurate for all commercial purposes. Write for information.



**Illinois Testing Laboratories Inc.**

412 N. La Salle St., Chicago, Ill.



### Swartwout Airjector

gives you power roof ventilation at its best. You can recommend it as a highly efficient ventilator for use where forced air movement is required or where the load varies. Large range of sizes, capacities.

**THE SWARTWOUT CO. 18511 Euclid Ave. Cleveland, Ohio**

## Michigan Convention

(Continued from Page 80)

tors in their separate session discussed the general problems of the roofing industry which, generally speaking, seemed not to be quite so difficult as the problems of the heating and sheet metal industries. Roofing materials are still easy to get, generally without any priorities, and repair and modernization loans including roofing are still constituting a very sizeable percentage of the total repair volume under government insured loans.

### Heating Branch

In the heating session, considerable discussion centered around an association emblem which would be made available to contractors for display in their windows or in their stores. The convention did not feel it was in a position to pass definitely on this emblem and therefore the matter was referred to the officers and Board of Directors for further discussion.

A striking example of how association co-operation can be extended to members was cited by G. R. Hendricks of Grand Rapids who said last fall he was visited by a representative of the Michigan Tax Commission and was told that he would be compelled to pay back sales taxes based on the contract price of his sales rather than on the cost price of equipment at the source. This would have necessitated a payment of approximately \$1,700. On the suggestion of the association and through their co-operation, Mr. Paul Reynolds, in Lansing, appeared before the Tax Commission and obtained a revision of this ruling. Had this ruling been placed in effect, it would have required the payment of many thousands of dollars by Michigan sheet metal, and warm air heating and roofing contractors.

It was reported that progress has been completely stopped on the proposed heating contractors' licensing bill since the present legislature is not looking with favor on licensing laws and until the end of the emergency probably nothing will be done on licensing.

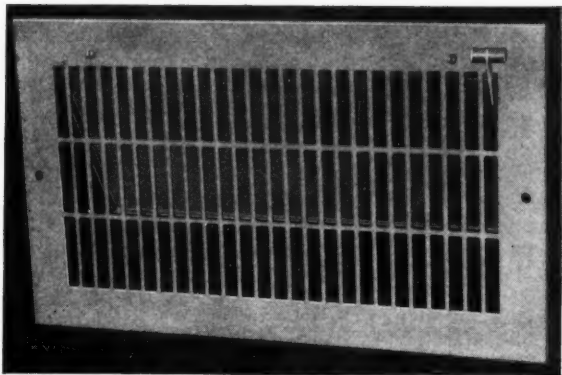
### Defense House Heating Prices

President-elect Elmer Schartow of Midland said he believed the association should give careful consideration to the final result of installations in defense houses. Installations in this type of house are now being installed complete including material, labor and equipment from \$150 to \$185. Many of these houses are going in without benefit of any standards of design or installation and Mr. Schartow said he felt the association should adopt or set up some standards which will place a definite value on these installations and make it advantageous for the builder or owner to specify heating systems meeting our present day standards of design and installation.

### Biddle's "Sheets" Financed

Secretary Biddle reported that his monthly mimeographed bulletin "Sheets" has been received very gratefully by members, but the cost of issuing this bulletin is considerable and additional funds are required. The warm air heating group voted to increase annual dues from \$5 to \$10 and of the additional \$5, \$2.50 should be used to publish the bulletin. The other \$2.50 will be used to print and distribute the emblem

# GRILLES and REGISTERS



**Fabricated or Stamped**

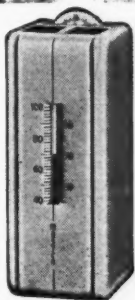
**You Can Get It Quicker from Stewart**

Production facilities for volume orders.  
Quick shipment of special sizes.

**Stewart Manufacturing Co.**  
309 Washington Street Orange, N. J.

## RUGGED CONSTRUCTION SIMPLE OPERATION

Those are the features that assure the trouble-free operation and long life of this regulator. For you, this means freedom from service calls and a friendly feeling on the part of your customers . . . when you install the



## MASTER HEAT REGULATOR TYPE P-23

This positive, snap action regulator operates on a differential of only  $\frac{1}{2}$  degree. Accurate, dependable, low cost, it will outlast the heating plant itself. Operates quietly, surely, and safely—to the complete satisfaction of the most exacting user. Write us today for bulletin giving complete information on the Master line.

**WHITE MFG. CO.**

Makers of Dependable Regulators for 25 Years  
2368 University Ave. ST. PAUL, MINN.

**A *New* MATERIAL TO  
TAKE THE PLACE OF  
SHEET COPPER AND  
GALVANIZED IRON.**

Cheney Pitch-On-Metal is the name of this new protected sheet metal that government departments in Washington are now specifying "for thru-wall flashing, ventilating ducts and all exterior sheet metal work".

Cheney Pitch-On-Metal is made in 26, 24 and heavier gauges. Call on your sheet metal distributor or write us direct for full information.

**THE CHENEY CO.** ARDMORE, PENNA.

## Premier FURNACE CLEANER

**THE SUREST WAY  
TO SERVICE VOLUME!**

Cleaning with the Premier Furnace and Boiler Cleaner is the logical way to develop service business in volume. It gives you a profit on cleaning jobs—it also gives you first-hand knowledge of needed repairs. Built for years of trouble-free use, this powerful, efficient cleaner can be easily operated by one man. Premier makes available post cards that develop prospects for cleaning service. Write for full information today.



### NEW IMPROVED MODELS

**Completely Equipped**

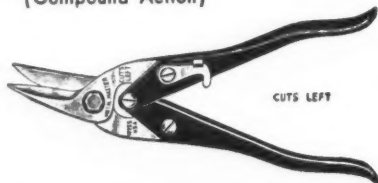
$\frac{5}{8}$  H. P. . . . \$74.50  
1 H. P. . . . \$89.50

Complete chimney  
cleaning equip-  
ment only  
\$10.00

**ELECTRIC VACUUM  
CLEANER CO., INC.**

1730 Ivanhoe Rd. • Cleveland, O.

## WISS "METAL-MASTER" SNIPS (Compound Action)



"TWICE  
THE WORK  
WITH HALF  
THE  
EFFORT"

TWO MATCHED PATTERNS M1 (Cuts Left) M2 (Cuts Right) Cut circles, squares and any irregular patterns on Stainless, Dural and Monel Metals with the greatest of ease. Jaws of wear-resisting Manganese Molybdenum Steel. Handles hot-pressed from tough Chrome Vanadium Steel. Nickel steel bolts and nuts to Government specifications. All parts interchangeable. Detachable rubber handle grips at slight extra cost.

J. WISS & SONS CO.

ESTABLISHED 1848

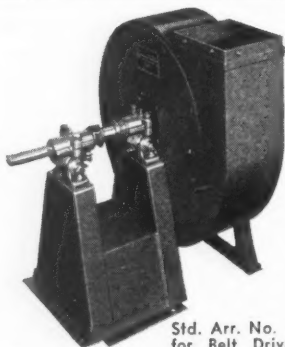
NEWARK, N. J.

Get the Facts About

## SAL-MO ASBESTOS DUCTBOARD

The New Metal Saving Material  
for Cold Air Return Ducts. Fire-  
proof . . . Moistureproof. Fully  
approved.

**SALL MOUNTAIN COMPANY**  
176 W. Adams St. Chicago



New and improved "EX" Fans are now available in standard sizes from No. 15 to No. 80 and from 200 to 30,000 CFM Capacity with pressures up to 15" W.G. These fans are commonly used for exhaust problems to handle dust, fumes, shavings, etc., but can be adapted for forced draft service.

"EX" Fans are furnished in all standard arrangements of the N.A.F.M. The design is such that it can be easily modified to suit special assemblies, thus "EX" Fans are ideal for resale purposes, as part of factory assembled units.

Std. Arr. No. 1  
for Belt Drive

Write us about your problems. Send for Bulletin No. EX-41

**BAYLEY BLOWER COMPANY**  
1817 South 66th Street Milwaukee, Wis.

**BE PREPARED FOR  
MAINTENANCE AND  
REPAIR WORK  
with a  
GRAND RAPIDS  
FURNACE  
CLEANER**

Write for Details



**DOYLE VACUUM CLEANER CO.**  
227 STEVENS ST., S. W. GRAND RAPIDS, MICH.

when, as and if it is adopted. For 1942, Ernie Simmons of Detroit was elected chairman of the heating group with Henry Delnay re-elected secretary.

### Plastics

A very interesting discussion and presentation of plastics was given by C. B. Branch of the Dow Chemical Company, Midland. Mr. Branch showed slides of the chemical formula and chemical reaction in the manufacturing processes of basic materials to finish plastics. He also described the growth of the plastics industry from a 20,000,000 pound annual volume to 160,000,000 pounds per year volume. The first plastic which found popular use was a synthetic billiard ball made in 1895, followed by casein derivatives which still have a wide use as plastics which are not exposed to water or moisture. Bakelite was one of the first plastics and Bakelite derivatives still constitute approximately one-half of all plastics used. Mr. Branch also showed a wide variety of plastic products and briefly explained their basic manufacturing processes and their physical characteristics.

### Salesmen's Meeting

The salesmen's auxiliary held its annual meeting and election of officers, electing Jim Morrissey of the J. M. & L. A. Osborn, Detroit branch, as president; Sam Hazenberg of Hopson Company, Grand Rapids, vice president; and Frank Roberts of the Detroit Safety Furnace Company as secretary and treasurer. Ernie Overbeck was made Sergeant-at-Arms. The Auxiliary extended a grateful vote of thanks to Ernie Simmons for his management of the Auxiliary entertainment and another vote of thanks to John E. Beh-



Many Thousands  
of American Boys  
in Camp Today  
are Comfortable  
because of  
**WEIR-MEYER**  
Heating Equipment

### Of Course We

are doing all we can to help America win the war—but we are also thinking beyond the "duration" to those days when you dealers will again be selling and installing heating equipment to "Keep the Home Fires Burning."

**The Meyer Furnace Co.**  
Peoria Illinois



**Payne**  
**QUALITY**  
WAS NEVER  
MORE IMPORTANT  
THAN IT IS TODAY!

**PAYNEHEAT**  
Payne FURNACE & SUPPLY CO., INC.  
— BEVERLY HILLS • CALIFORNIA —

ler of the Behler-Young Company for his work as secretary for the past year.

A banquet and entertainment by the Detroit association was presented the first evening with an excellent floor show. On the second night another banquet and another floor show and entertainment was presented to the association by the Travellers Auxiliary.

#### OFFICERS

President ..... Elmer Schartow, Midland  
Vice President..... H. Vander Woude, Muskegon  
Treasurer ..... P. O. Wierenga, Grand Rapids

#### DIRECTORS

Henry Delnay, Grand Rapids  
Leonard Hendrickson, Flint  
Ernie Simmons, Detroit

### Kramer Reduces Duct Costs

(Continued from Page 53)

may not look as pretty as possible. But—the cost will come down. Having sacrificed these "nice-ties" the contractor is then ready to simplify by eliminating every possible fittings which can be replaced by a fitting which serves a dual or triple purpose. And when fittings have been reduced to the fewest possible, if the contractor will make up pieces and parts in hundreds of units at a run—cost will be really reduced.

## THERMO-DRIP HUMIDIFIERS

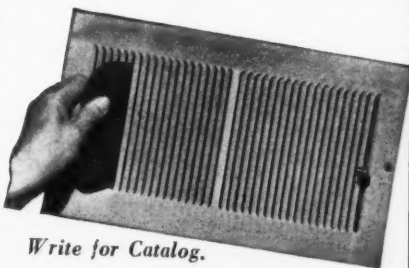


These floatless, drip-feed humidifiers prevent water from coming in contact with two or more metals simultaneously. That explains why THERMO-DRIP installations are singularly free from electrolysis!

**AUTOMATIC HUMIDIFIER CO.**  
18th and Main Streets CEDAR FALLS, IOWA

### STANDARD "BEND-EZY" REGISTERS INSURE SATISFACTION!

*Ideal for Low Cost  
Defense Housing!*  
Everything you want  
in Registers! Easy in-  
stallation, adjustable  
airflow, efficiency and  
durability. Reasonably  
priced.  
Specify STANDFORD  
Grilles for modern  
design.



Write for Catalog.

**STANDARD**

3137 W. 49th PLACE

**STAMPING &  
PERFORATING CO.**  
CHICAGO, ILLINOIS

# RYERSON CERTIFIED STEELS

#### 10 STRATEGICALLY-LOCATED PLANTS

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structural, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

### TRY US FOR QUICK DELIVERY

Sheet Metal Fabricating

## MACHINES & TOOLS

Write for Catalog and New Bulletin No. 53

### WARD MACHINERY CO.

564 W. Washington Boulevard  
Chicago, Illinois

## CHICAGO STEEL BRAKE



BEST BY FORTY-TWO YEARS TEST

**DREIS & KRUMP MFG. CO.**  
7404 LOOMIS BLVD. CHICAGO

## HIGH EFFICIENCY...

LOW POWER COSTS



LARGE, STREAMLINED INLET MEANS MINIMUM  
LOSSES DUE TO ENTRANCE FRICTION OR EDDIES

WITH THIS

**Sturtevant  
MILL EXHAUSTER**

B. F. STURTEVANT COMPANY  
Hyde Park, Boston, Mass.  
Branches in Principal Cities

"Designed and Built by the Pioneer"

# Repair parts


FOR ALL HEATING UNITS



**A. G. BRAUER SUPPLY CO.**  
*Distributors of All Heating and Air Conditioning Equipment*  
 2100 Washington Ave. St. Louis, Mo.

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**BERGER BROTHERS CO.**  
 Main Office & Factory  
 229-237 Arch St., Philadelphia, Pa.

## BARBER BURNERS

### For ALL Gas Appliances



S-80



Z-21

We supply Burner Units to hundreds of leading gas appliance manufacturers. We will design and furnish the proper size burner, with the proper jets, for YOUR appliance. BARBER Burners give complete combustion on natural, manufactured, bottled or Butane-Propane Gas.

Latest Catalog on request.

**THE BARBER GAS BURNER CO.**  
 3704 Superior Ave., Cleveland, Ohio

## YOUR PATRIOTIC DUTY

A lot of heating plants in your community will soon be on vacation. Rusting and corroding through the summer, to be slackers and fuel wasters next fall unless you get out and clean them now. You are well paid for the work. Repairs and new plants follow. A Super Red Streak Furnace Cleaner is all you need. TRY a Super 5 days FREE and see how easy—and profitable—it is to help your nation save coal and your neighbor save money.

**THE NATIONAL SUPER SERVICE CO.**  
 1944 N. 13th St. Toledo, Ohio

## SPOT WELD

WITH AN

### ACME "Hot Spot" WELDER

Proven utility for over 26 years in thousands of sheet metal fabricating plants.

Write for Literature and Prices.

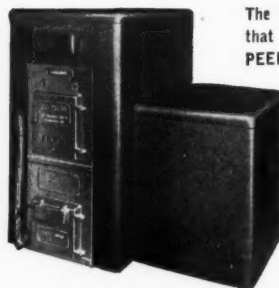
Complete Range of Sizes

Lifetime Guarantee!

**ACME ELECTRIC WELDER CO.**  
 2618B Fruitland Road Los Angeles, Calif.



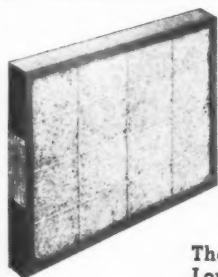
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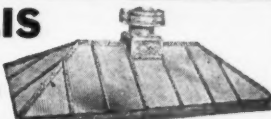
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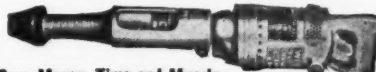


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Constructed of quality materials to give greatest amount of light and maximum strength of construction. Ventilator is absolutely water tight. Pivoted metal dampers will be included with ventilators, so hung that normally they will be closed. Skylights can be constructed to any size required.

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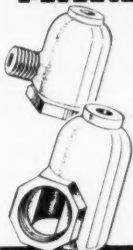
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**Better for Every Spraying Purpose**

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\* Finer, more uniform spray.  
\* Effective operation at low pressures. \* No internal parts to clog or wear.

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Reg.

Two standard fluxes for all soft soldering. Safe, quick, certain. Buy them at your jobbers or write us if we cannot supply you.

1/2 lb., 1 lb., 5 lb. cans; 2 oz., 6 oz., 12 oz.

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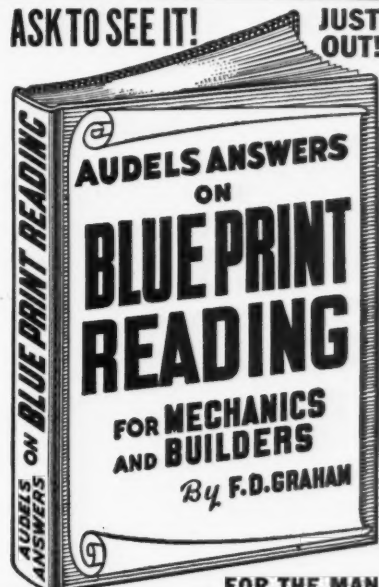
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**Shreveport Engineering Co., Inc.**

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**ASK TO SEE IT!**

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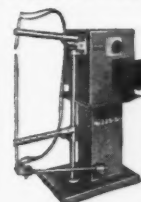
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CHAS. EISLER

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KVA; 35 KVA; 75 KW; 100 KW;

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SPOT: American Electric Fusion—15 KVA, 13

KVA, 9 1/2 KVA, 220 volt, 60 cycle, 14", 15",

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*Sales Offices in Principal Cities*

*division of*



**NATIONAL STEEL CORPORATION**

*Executive Offices, Pittsburgh, Pa.*

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and Century Motors Aid Production*

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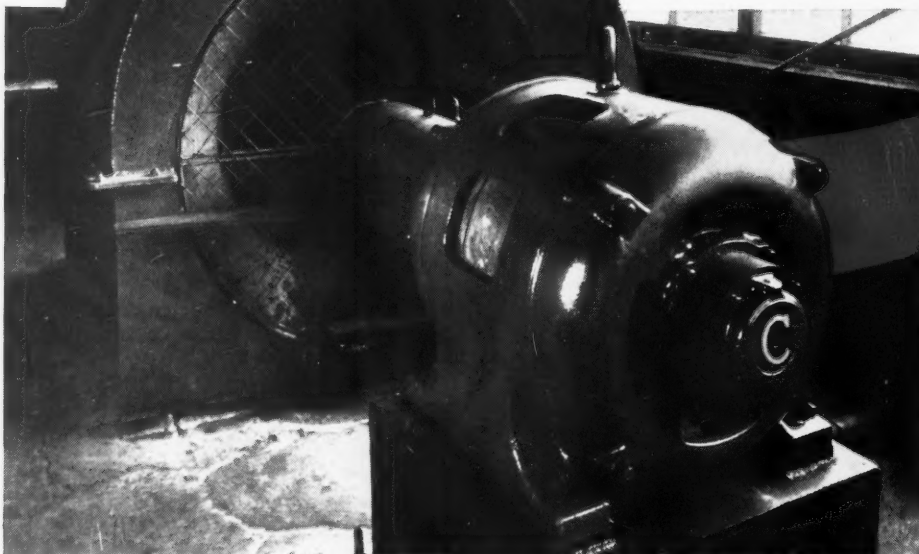
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